Shared Data Reference

IND500x

Weighing Terminal

METTLER TOLEDO

IND500x Weighing Terminal

METTLER TOLEDO Service

Essential Services for Dependable Performance of Your IND500x Weighing Terminal

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1 Introduction and Overview

The Shared Data (SD) Server is the central repository for all "system" data in the IND500x. It is also the primary interface for sending commands and exchanging data between local or remote Applications and the Resident Scale Task (RST) in the IND500x. The RST is the portion of the terminal firmware that specifically controls weighing functions.

The term "Application" is frequently used to indicate the use of Task Expert custom programming, but also refers to non-TE custom programming that accesses and manipulates Shared Data fields to carry out specific functions and processes.

1.1. IND500x Shared Data Design

The Shared Data concept has been a very powerful and flexible tool. It provides mechanisms for both storing system data and for providing interfaces among Local Applications, Remote Applications, and the Resident Scale Task.

1.1.1. Shared Data Design Concepts

The following are some important Shared Data design concepts incorporated into the IND500x Shared Data:

- Shared Data provides Local and Remote Applications and the Resident Scale Task very fast access to the permanently stored data. Shared Data access time is less than 350 microseconds.
- Provides a consistent naming convention among all Shared Data fields. Local and Remote Applications access a Shared Data field using a six-character name. Names provide consistency to Applications in accessing Shared Data fields in successive versions of Shared Data. The names for existing fields will remain the same even when new fields are added or when new physical storage locations are assigned to existing data. Shared Data uses a binary search of the names in the Data Dictionary to find a field definition quickly
- Shared Data is organized into "object-oriented" blocks that make it is easier for Application programmers and users to understand how to use Shared Data.
- Shared Data uses a Shared Data Dictionary that is an alphabetically sorted list of all the fields in Shared Data. The Shared Data Dictionary provides the name, storage type, data type, attributes, location, and length of each field. Shared Data uses the dictionary to find and process Shared Data requests.
- Data types are standardized and limited to a small, defined, consistent group.

- Provides data access control on an individual field basis, rather than on a block basis as in previous products like the JagXtreme. IND500x has three levels of access security: Operator, Supervisor, and Administrator.
- Data Storage Types and data fields are organized to make best use of the memory available on the IND500x. In particular, the terminal uses Flash memory to store protected setup fields that change infrequently. Protected process fields that change frequently are stored in Battery-backed RAM (BRAM); dynamic fields in Dynamic RAM; and scale calibration data in EEPROM on the scale boards.
- Shared Data supports "callbacks" that alert a task when a Shared Data field changes. An Application or Resident Scale Task can "Register a Callback Routine" for a particular Shared Data field. Then, when a task writes a new value to a Shared Data field that has a registered callback, Shared Data calls the registered callback routine.
- Shared Data supports both "native" and "string representation" access to data fields. However, Shared Data always stores the data fields in their native format. When an Application accesses a Shared Data field in its native data format, such as binary floating point or integer number representations, Shared Data simply copies the data between its storage and the Application interface. When Applications access the Shared Data using a string data format, Shared Data makes the data conversion between the native and the string data format.
- Shared Data provides access to an entire Shared Data block with a single read or write command. Applications can access the block of data in either native format or string format. When an Application accesses the data in native format, Shared Data returns a "C-style structure" that matches the native format of the data. When an Application accesses the data in string format, Shared Data converts each individual field to its string format, separating fields with a caret ('^').
- Shared Data provides a checksum on each protected Shared Data field. It verifies the checksum on power-up and on each read access. It recalculates and stores the new checksum on each write access. When Shared Data detects a checksum failure, it reports a system failure.
- A Change Log file is available that records every change to the Protected Setup Shared Data fields. This forms a service record that the customer or service technician can review to find or validate changes to the IND500x setup. Recording all process changes is becoming an important requirement for U.S. pharmaceutical applications.
- Validates changes to Protected Setup and Calibration EEPROM fields. It compares the new value with the range of legal values in the Shared Data Dictionary. If Shared Data finds the new value is not legal, it does not update the field and returns an error status to the Application.
- Permits an FTP connection to save Shared Data to and restore it from a PC.

1.2. Shared Data Name Structure

Each Shared Data field has a six-character alphanumeric "name" that the Application uses to access the Shared Data field. The name contains the class, instance, and attribute of the Shared Data variable, each of which is two characters long. For example, Shared Data variable "sp0106" is the latched/unlatched target setting of the single (instance) scale the IND500x will support at one time. The name is constructed as follows:

sp	=	Class	=	Full Target Process Data (Note: Class can be written as all uppercase or all lower case)
01	=	Instance	=	Scale #1
06	=	Attribute	=	Target Latch Type

1.3. Shared Data Storage Types

There are four types of IND500x Shared Data:

D	Dynamic (Dynamic RAM) Shared Data
PP	Protected Process (BRAM) Shared Data
PS	Protected Setup (FLASH) Shared Data
PC	Protected Scale Calibration (EEPROM) Shared Data

These letters are used in this document to identify the data type of each block.

1.3.1. Dynamic Shared Data

Dynamic Shared Data is process data that the Resident Scale Task or Applications dynamically create within the IND500x. The IND500x writes Dynamic Shared Data to Dynamic RAM memory, and it writes and reads these fields very frequently. The IND500x does not save this Shared Data across a power-failure, but re-initializes it to zero at power-up. The best example of Dynamic Shared Data is the Dynamic Scale Weight data (WT).

1.3.2. Protected Process Shared Data

Protected Process Shared Data is persistent data that may be written and read many times. The Resident Scale Task and Applications use this Shared Data to maintain the state of an active process. However, in case of a power-failure the IND500x must save the data so the process can continue after power-up. The IND500x writes this Shared Data to battery-backed RAM (BRAM) to save it across a power failure.

An example of Protected Process Shared Data is the state of a Material Transfer process, where you cannot afford to throw out an incomplete batch of material after a power-failure. The IND500x must save its state so the Material Transfer can continue after a power-up.

1.3.2.1. Writing BRAM Shared Data During Power-Down

A critical event occurs when the IND500x attempts to write to BRAM Shared Data just as the power goes down. The IND500x writes part of a Shared Data field successfully, and then power drops below a valid-power threshold before the IND500x can complete the write, causing a corrupted BRAM. Since writes to BRAM can occur frequently in a process control environment, it is probable that this will happen at some point when the IND500x is running.

To protect against this potential problem, the IND500x does a two-stage write procedure whenever it writes to BRAM:

- The IND500x first writes a write-in-progress flag, the new Shared Data field, its SD field index, and its checksum to a temporary location in BRAM. When this write is successfully completed,

the IND500x then writes the SD field and its checksum to its actual location in BRAM. When this write is successfully completed, the IND500x clears the write-in-progress flag.

- At power-up, the IND500x checks the write-in-progress flag. If it is set, the IND500x writes the original SD field from the temporary field and clears the write-in-progress field.

1.3.3. Protected Setup Shared Data

Protected Setup Shared Data is the persistent data that stores the unique configuration of the IND500x. The IND500x Setup Procedure typically writes this data once during the Setup procedure and then never writes it again. Other processes may read it many times. The IND500x writes this Shared Data to Flash Memory to save it permanently across a power-failure.

1.3.3.1. Writing Flash Shared Data During Power-Down

A critical window occurs when the IND500x attempts to write to Flash Shared Data just as the power goes down, causing corrupted Flash Shared Data. The IND500x writes part of a Shared Data field successfully, and then power drops below a valid-power threshold before the IND500x can complete the write.

To reduce the likelihood of this corruption, the IND500x only writes to the Flash during Setup. The IND500x never writes to Flash Shared Data during normal operation. The period the IND500x spends in Setup is extremely small compared to the time it spends in normal operation. Typically, the service technician sets up the IND500x once and never accesses Setup again.

To protect against the potential corruption problem, the IND500x does a multi-stage write procedure whenever it writes to FLASH:

- When the IND500x first writes the new Shared Data field data, it writes the SD field index and sets a write-in-progress flag to temporary locations in BRAM.
- After successfully completing this write, the IND500x then writes the SD field to its actual location in FLASH, in the FLASH.bin file.
- It records the change in the change history log file.
- After successfully completing the write to flash, the IND500x clears the write-in-progress flag. Upon exiting setup, the IND500x creates a backup copy of the FLASH.bin file.
- At power-up, the IND500x reads the FLASH.bin file into memory. If this fails, the IND500x checks for the presence of a FLASH backup file. If it exists, it copies the flash backup and restores any additional entries from the change history log file. The IND500x then checks the write-in-progress flag. If it is set, the IND500x writes the original SD field from the temporary field and clears the write-in-progress flag.

1.3.4. Protected Scale Calibration Shared Data

Protected Scale Calibration Data is the persistent scale calibration data. The IND500x writes this Shared Data to the EEPROM on the Scale boards to protect it across a power-failure. On power-up, it reads an image of the EEPROM into the Protected Process BRAM Shared Data, where the Resident Scale Task and Applications can read it. The IND500x only writes the EEPROM after a successful scale calibration.

1.3.4.1. Writing EEPROM Shared Data During Power-Down

A critical event occurs when the IND500x attempts to write to EEPROM Shared Data just as the power goes down. The IND500x writes part of the EEPROM successfully, and then power drops below a valid-power threshold before the IND500x can complete the write, causing a corrupted EEPROM.

To protect against this problem, the IND500x does a two-stage write procedure whenever it writes to EEPROM:

- The IND500x first writes a write-in-progress flag and the new EEPROM data into a temporary location in BRAM. When this write is successfully completed, the IND500x then writes the data and its checksum to the EEPROM. When this second write is successfully completed, the IND500x clears the write-in-progress flag.
- At power-up, the IND500x checks the write-in-progress flag. If it is set, the IND500x writes the EEPROM from the temporary field and clears the write-in-progress field.

1.4. Command Triggers

The Resident Scale Task uses Shared Data callbacks for triggering its internal commands. Then, the RST uses other Shared Data status fields for reporting the activity and the results of its commands. Typically, command triggers reside in Dynamic Shared Data. Applications can also use Shared Data callbacks for triggering commands. There are many fields in Shared Data that enable applications to define command triggers.

Callbacks are a powerful mechanism for sending commands to the Resident Scale Task or to Applications through writes to Shared Data. The destination task must first register a callback to Shared Data on its designated command field. Then, local or remote processes may initiate a write to the field to trigger a callback to the destination task. The IND500x designates the special Shared Data fields that can use callbacks as "real-time" fields. In this document, "rt" designates real-time fields, while "na" designates non-real-time fields that do NOT support callbacks.

Edge-Sensitive commands are also real-time fields, but the IND500x only makes a callback to process these commands when the field transitions from zero to a non-zero value. In this document, "rc" designates edge-sensitive command fields.

1.5. Application Commands to the Resident Scale Task

Applications can issue commands to the Resident Scale Task using the Shared Data Command Triggers. The Application sets the Command Trigger to 1 to issue the command. This generates a callback to the Resident Scale Task. The Resident Scale Task detects that the Command Trigger is set and processes the command. When it is done processing the command, the Resident Scale Task sets the Command Trigger back to 0.

A Shared Data Command Status is associated with each Command Trigger. The Application can read the Command Status to determine the completion status of the command. 0 indicates that the

command was successful, and 1 indicates the command is in progress. A status greater than 1 is a specific failure code. The Application can monitor the Command Trigger or Command Status to know when the command is complete.

For example, to issue a Tare Command to the scale, the Application sets Shared Data field wc0101 to 1. Then, the Application monitors for the Shared Data field wx0101 to be set to 1, which indicates the command is in progress. Then, it monitors for wx0101 to change again to get the completion status of the command. The Resident Scale Task then sets wc0101 to 0 when it completes the command.

1.6. Data Format Types

IND500x Shared Data supports the following data types:

Mnemonic	Data Type	Description
BI	I1	Boolean fields are one-byte integers, but can only take a value of 0 or 1.
By	I1	One byte integer
US	UI2	Two byte unsigned integer
UL	UI4	Four byte unsigned integer
F	R4	Single precision floating point
D	R8	Double precision floating point
ABy nn[1] ABI nn[1]	Array I1 Array I1	Array of I1 Array of I1 Boolean
S mm[2,3]	Array UI	A UTF-8 String. Array of I1
AL nn[1]	Array UI4	Array of UI4
Struct	Struct	Composite structure of entire block (not included in this Reference)

1. "nn" represents the length of the array
2. "mm" represents the max length of the UTF-8 String.
3. "S mm" is not mandatory, but the data must have a NULL terminator. The application must ensure that the string has a NULL terminator. Recommended practice is described below:

   Example: Shared data (aa0101) type is S20

   a. Write access:

   ```
   char sdata[20+1]; // The buffer length is 20+1 to ensure there is room to store the NULL terminator.
   // Make sure the sdata buffer is 0x0
   Memset(sdata, 0x0, sizeof(sdata));
   // Set the value into sdate; maximum length is 20
   Strcpy(sdata, "12345678901234567890");
   PG_DEP_CALL(ParameterManager)->param_set_pF(sdata, aa0101,
   PG_ParameterManager_USER_ACCESS_SYS);
   ```

   b. Read access:

   ```
   char sdata[20+1];
   // Make sure the sdata buffer is 0x0
   ```

```
Memset(sdata, 0x0, sizeof(sdata));
PG_DEP_CALL(ParameterManager)->param_get_pF(sdata, aa0101,
PG_ParameterManager_USER_ACCESS_SYS);
```

1.7. Change History Log

The IND500x maintains a history of all changes to the Setup and Calibration Shared Data in a resident Flash Memory file. There is a separate record for each changed field. The record contains the field name, date and time, user ID, and the new contents of the field. It also maintains a history log of all Shared Data backups and restores.

1.7.1. Functions of the Change History File

- It provides traceability of changes to Setup and Calibration data. It allows the customer or service technician to find and view the changes to Shared Data. They can validate that the system has been setup properly and that Shared Data contains only the authorized settings.
- It satisfies the FDA CFR 21 Part 11 regulations for the U.S. food and pharmaceutical industries for maintaining strict control over the safety of their processes and for documenting any changes to their processes.
- In case of a catastrophic system failure, you can use an archived Change History file to reconstruct Shared Data. To recover the system, you must first reset the system to the factory defaults and then use a utility to apply the changes from the Change History file one at a time.

The format of each history record is:

"SSSSSS DDDDDD TTTTTT AUTHOR L VALUE"

Where:

- SSSSSS is the six-letter Shared Data Name;
- DDDDDD is the date of change from xd0103;
- TTTTTT is the time of change from xd0104;
- AUTHOR is the name of the user who made the change from xd0125, xd0127, or xd0129;
- L is the security-level of the user who made the change from xd0126, xd0128, or xd0130;
- VALUE is a UTF-8 representation of the new value written to the Shared Data variable.

The Change History can contain a maximum of 1,000 records.

When the file is 75% full, the IND500x SD issues a warning to the user that the file is becoming full. Then, the user can offload it to a PC using FTP and reset the resident log file.

When the file becomes 90% full, the IND500x SD issues an urgent warning to the user. Again, the user can offload the log file to a PC and reset the resident log file.

When the file becomes 100% full, the IND500x SD issues an "error alert" to the operator and halts any further updates to Setup until the user takes the appropriate action to save and reset the resident log file.

1.8. Shared Data Access Control

IND500x Shared Data provides data access control for individual fields, rather than on a block basis like previous product such as the JagXtreme. The Shared Data Dictionary holds the "access privileges". The "access privilege" attributes for each Shared Data field determines how local and remote applications can access the fields. Generally, anyone can read any Shared Data element. The notable exceptions are password fields, which only the IND500x System modules may read. Hard-coding in Shared Data restricts read-access to the password fields. The Shared Data Dictionary defines the write-access privileges on an individual field basis, according to the class of the user.

There are three classes of user – Administrator, Supervisor, and Operator. The Administrator class always has the maximum possible write-access capability. However, not even an Administrator can write into "Read Only" fields. Typical Read Only fields are Real Time Data fields that contain the weight data for the scale.

There is no enforced class hierarchy below Administrator. Other classes have write-access to fewer Shared Data fields. By convention, the Operator class has the fewest rights, and the Supervisor class is a superset of the Operator class. Shared Data fields have factory-default access rights that meet most Application needs. In the default definition, each higher class has also write-access privileges to all data assigned to lower classes.

To satisfy legal metrology regulations or customers' security concerns, it is often necessary to limit terminal write-access after the customer has installed the terminal. For example, no user of any class may change setup parameters after a government inspector has certified and sealed the terminal.

The IND500x has a Security Switch on its main PCB. The service technician can mechanically seal the IND500x to prevent tampering with the Security Switch. When in the UNSECURED position, authorized users may write to Shared Data fields according to the "access privilege" bits in the Shared Data Dictionary. In the SECURED position, NO users have write-access to Shared Data fields that previously had Administrator-only write privileges.

1.9. Validating Setup Data

IND500x Shared Data validates changes to Protected Setup and Calibration EEPROM fields. It compares the new value with the range of legal values stored in the Shared Data Dictionary. If Shared Data finds the new value is not legal, it does not update the field and returns an error status to the Application.

Shared Data does not validate all fields. It only validates those that it can validate using a table of values. It does not validate those fields that require special programming logic to validate.

Shared Data supports an Application command that returns the validation criteria for a particular field to the Application so the Application can display the list of legal values.

The Shared Data Dictionary has different validation criteria based on the type of validation required. Some of the validation types include:

- Boolean validation. Only zero (0) or one (1) is a legal value.
- Range validation. Only values within a range are valid. The Data Dictionary contains the minimum and maximum legal values. For example, integer values from one to five are valid, or floating-point values from 0.0 to 9.9 are valid.
- List validation. Only values in a list of values are valid.
- No validation.

1.10. Shared Data Server Commands

After connecting to the Shared Data Server in the IND500x, several commands are available for use. All commands can be given in either upper- or lower-case letters. The quotation marks shown are for clarity only and should not be transmitted. Valid commands are described in the following sections.

- **Response Format**: "read", "write", and "callback" message responses have a formatted header. The first two characters indicate the status. "00" is the success status. "99" is a failure status. The next character is the type of message, "r", "w", or "c". The next three characters are a sequence number, which cycles from 001 to 999, and then starts over again.

1.10.1. "user" Command

A client must login to the SDSV using the "user" command before accessing Shared Data. The server validates the username and sends a response message back to the user. The SDSV responds with [Access OK] if no password is required or [Enter password] if a password is required.

A client can use only the "user", "pass", "help" and "quit" commands before successfully logging on.

Format: user username

Response 1: 12 Access OK

Response 2: 51 Enter Password

1.10.2. "pass" Command

The user enters a password using the "pass" command. If the password is valid, the server displays the [Access OK] message. If not valid, the server displays the [No access] message.

Format: pass password

Response: 12 Access OK

1.10.3. "help" Command

The "help" command returns the list of the valid commands for the IND500x.

Format: help

Response: 02 USER PASS QUIT READ R WRITE W SYSTEM CALLBACK XCALLBACK GROUP RGROUP XGROUP CTIMER LOAD SAVE HELP NOOP CONTOUT XCOUNTOUT PRINTOUT XPRINTOUT

1.10.4. "quit" Command

The "quit" command terminates the TCP/IP connection.

Format: quit

Response: 52 Closing connection

1.10.5. "read" Command

The "read" command allows the client to read a list of one or more Shared Data fields. An individual field or an entire block can be read. If more than one field is requested, the fields should be separated by a space. If successful, the server responds with a separated list of values in ASCII format. The server separates individually requested fields with a "~"; and Shared Data separates items within a block with a "^". If an error is detected, the server responds with an error message. The maximum length of the reply message is 1,024 characters.

Format: read SDV#1 SDV#2

Example 1: read wt0101 wt0103

Response 1: 00R003~ 17.08~lb~

Example 2: read sp0100 (reads entire block)

Response 2: 00R012~XP/0163M^1^^78^20.500000^0^0^0^1.200000^3.500000^0.150000^0.050000^0^0.000000^0.000000^0^0^0^0^0^0^1^0.000000^0.000000^0.000000^0.000000^0.000000^~

- The "read" command can be abbreviated to the letter "r" if desired.

1.10.6. "write" Command

The "write" command allows the client to write a list of one or more Shared Data fields. A single field or an entire block can be written. The maximum length of the write message is 1,024 characters. Items within a list of writes must be separated with a "~". You must separate items within a block with a "^".

Format: write SDVblock#1=value1^value2^ value3 write SDV#1=value1~SDV#2=value2~SDV#3=value3

Example1: write ak0100=abc^def^hij^lmn (writes fields into a block)

Response 2: 00W006~OK

Example 2: write aj0101=12.56~aj0150=987.653 (writes fields within a list)

Response 2: 00W007~OK

- The "write" command can be abbreviated to the letter "w" if desired.

1.10.7. "system" Command

The "system" command returns a description of the IND500x terminal. This is the same information that is shown on the Recall System Information screen of the IND500x.

Format: system

Response: 0S005~ SYSTEM INFO RECALL

Model: IND500x
S/N:
ID1: IND500x
ID2: METTLER_TOLEDO
ID3:
Software
Boot: L2.00 181348
Standard: L3.00 181349
Hardware
Analog L/C
Opt: E-Net

1.10.8. "noop" Command

The "noop" command performs no task; it checks communication and returns an [OK] response message.

Format: noop

Response: 00OK

1.10.9. "callback" Command

The "callback" command allows the client to define one or more fields for which the Shared Data Server sends a message to the client when the value of the callback field changes. Only certain SDV may be included in a callback command. These SDV are noted by an "rc" or "rt" status in the column after the structure column in the Shared Data document. Mainly, these are triggers that are used in the terminal. SDV with a status of "na" are not real-time SDV and cannot be used in callbacks.

The callback message contains one or more changed field names and the new value for each field. A maximum of twelve callback fields can be specified. The "ctimer" command specifies the minimum time between repeated callback messages.

Format: callback SDV#1 SDV#2

Example: callback st0102 st0103 st0104

Response 1: 00B001~OK

Response 2: 00C005~st0102=0^st0103=1^st0104=1 (sent when all of the SDV change)

Response 3: 00C006~st0104=0 (sent when only st0104 changes)

1.10.10. "xcallback" Command

The "xcallback" command allows the client to remove one or more callback fields from the list of current SDV.

Format: xcallback SDV#1 SDV#2 or xcallback all (removes all callbacks)

Example: xcallback st0102 (removes st0102 SDV from callback)

Response: 00X008~OK

1.10.11. "group" Command

The "group" command allows the client to define a group of callback fields. The Shared Data Server sends a message to the client when the value of any field in the group changes. The group callback message contains the group number and the values of all fields in the group in the defined order. The "ctimer" command specifies the minimum time between repeated callback messages. The maximum number of groups is six, and the maximum number of fields in a group is twelve.

Format: group n SDV#1 SDV#2 SDV#3 (where n = the number of the group 1–6)

Example: group 5 st0103 st0104 st0107 (groups target feeding and tolerance SDV into one group)

Response 1: 00B019~OK

Response 2: 00C026~group5=0^1^0 (indicates status of all 3 SDV in group 5 whenever any one of them changes)

1.10.12. "rgroup" Command

The "rgroup" command allows the client to define a group of fields. The client can use the group number to read the entire group at once using the READ command. The maximum number of groups is six, and the maximum number of fields in a group is twelve.

Format: rgroup n SDV#1 SDV#2 (where n = the number of the group 1–6)

Example: rgroup 3 di0101 di0102 di0103 di0104 (groups all discrete inputs into one group that can be read with a single read command)

Response: 0G008~group=3, number fields=4

Read Example: r 3

Response: 00R009~1~0~1~0~

1.10.13. "xgroup" Command

The "xgroup" command allows the client to remove one or all groups.

Format: xgroup n (where n = the group number 1 - 6) or XGROUP all (removes all groups, including "contout" and "printout")

Example: xgroup 5 (cancels group 5)

Response: 00X011~group=5

1.10.14. "ctimer" Command

The "ctimer" command allows the client to set the minimum time between repeated callback messages in milliseconds. The minimum allowable setting is 50 milliseconds and the maximum is 60 seconds. The default value is 500 milliseconds.

Format: ctimer n (where n is the number of milliseconds)

Example: ctimer 1000 (set the callback timing to 1 second)

Response: 00T862~new timeout=1000

1.10.15. "csave" Command

The "csave" command saves the current callback and group settings into Shared Data for use later with the "cload" command.

Format: csave

Response: 00L004~OK

1.10.16. "cload" Command

The "cload" command loads the callback and group settings from Shared Data into the shared data server. The terminal will begin to service the loaded callback and group commands.

Format: cload

2 Scale Data

2.1. Scale Functionality

2.1.1. Dynamic Scale Weight (WT)

Access:	"Read Only" Access.		
Class Code:	0x68	Data Type:	D
Instances:	1	Instance 1 = Scale platforms 1	

2.1.1.1. Attributes

wt0101	Displayed Gross Weight	S13	rt	Rounded Gross Weight shown in selected increment size.
wt0102	Displayed Net Weight	S13	rt	Rounded Net Weight shown in selected increment size.
wt0103	Weight Units	S6	rt	lb pounds, kg kilograms, grams, oz ounces, oztroy, dwt pennyweights, metric tons, ton, or custom units name
wt0104	3rd Weight Unit Gross Weight	S13	rt	Shows the current displayed gross weight converted to 3rd units
wt0105	3rd Weight Unit Net Weight	S13	rt	Shows the current displayed net weight converted to 3rd units
wt0106	Third Weight Unit	S7	rt	lb pounds, kg kilograms, grams, oz ounces, lb-oz pounds & ounces, oztroy, ounces, dwt pennyweights, metric tons, ton, or custom units name
wt0108	Displayed Rate	S13	rt	
wt0110	Rounded Gross Weight	D	rt	Gross weight rounded to selected increment size, but displayed in SD at smallest division value possible.
wt0111	Rounded Net Weight	D	rt	Net weight rounded to selected increment size, but displayed in SD at smallest division value possible.
wt0112	Rounded 3rd Weight Unit Gross Weight	D	rt	Shows the current displayed gross weight converted to 3rd units and rounded to selected increment size, but displayed in SD at smallest division value possible
wt0113	Rounded 3rd Weight Unit Net Weight	D	rt	Shows the current displayed net weight converted to 3rd units and rounded to selected increment size, but displayed in SD at smallest division value possible
wt0114	Fine Rate	D	rt	Rate displayed to the smallest division value possible.
wt0115	Scale Processing State	By	rt	0 = Disabled. 1 = Normal Weight Processing. 5 = Error.
wt0116	Continuous Output Status Word A	By	rt	Status of bit A of Standard Mettler-Toledo Continuous
wt0117	Fine Gross Weight	D	rt	Gross weight displayed to the smallest division value possible.

wt0118	Fine Net Weight	D	rt	Net weight displayed to the smallest division value possible.
wt0119	Weight Range	By	rt	0, 1, 2, or 3
wt0120	Filtered Weight Counts	D	rt	
wt0126	Standard Continuous Output Strings	S20	rt	Standard METTLER TOLEDO Continuous Output
wt0127		S200	rt	Template Continuous Output Format
wt0128		S30	rt	Extended METTLER TOLEDO Continuous Output
wt0133	IDNet Restart Zero String	S25	na	Message specific to IDNet base.
wt0134	IDNet Scale Update Rate	S25	na	"F MF"Message specific to IDNet base. The general format of the message from the IDNet base is as follows: □ F □ M L □ *x* □ *i* [□ *i* □ *i* ...] CR LF *x* = □ actually adjusted value *i* = □ adjustable values
wt0135	IDNet Scale Vibration Adapter	S25	na	"F MI" Message specific to IDNet base.
wt0136	IDNet Weighing Process Adapter	S25	na	"F ML"Message specific to IDNet base.
wt0137	IDNet Automatic Stability Detection	S25	na	"F MS" Message specific to IDNet base
wt0138	IDNet Auto-Zero Setting	S25	na	"F MZ" Message specific to IDNet base
wt0139	IDNet Software Part Number	S12	na	"P" Message xxxx-x-xxxx string from IDNet base
wt0140	IDNet Calibration Identification Code	S3		"I" Message 00 to 99 calibration count from IDNet

2.1.1.2. Method

The Resident Scale Task updates the dynamic weight Shared Data at every weight update, whenever the weight changes. The RST converts the weight from the raw filtered counts to the Legal-For-Trade weight.

2.1.2. Scale Process Data (WS)

Access:	"Read Only" Access.		
Class Code:	0x66	Data Type:	PP
Instances:	1		

2.1.2.1. Attributes

ws0101	Current Scale Mode	By	rt	G = Gross = 71 (ASCII Character) N = Net = 78 (ASCII Character)
ws0102	Rounded Tare Weight	D	rt	Tare weight rounded to selected increment size, but displayed in SD at smallest division value possible.
ws0103	Fine Tare Weight	D	rt	Tare weight displayed in SD at smallest division value possible.
ws0104	Rounded 3rd Unit (auxiliary) Tare Weight	D	rt	3rd unit tare weight rounded to selected increment size, but displayed at smallest division value possible.

ws0105	Current Units	By	rt	1 = Primary, 2 = Secondary, 3 = Third
ws0106	Tare Source	By	rt	1 = Pushbutton. 2 = Keyboard. 3 = Auto tare.
ws0107	Current Zero Counts	D	na	Power up zeroing, Pushbutton zeroing, & Auto-zero maintenance can modify the current zero. The "reset to factory" value is -999999.0, which tells the RST to initially set the current zero to the calibrated zero.
ws0108	Stored Weight	D	na	Initial weight for Net-Sign Correction
ws0109	Tare Source String	S2	na	PT = keyboard tare, otherwise "T "
ws0110	Displayed Tare Weight	S13	na	Rounded Tare Weight shown in selected increment size.
ws0111	Displayed 3rd Unit (auxiliary) Tare Weight	S13	na	Rounded 3rd unit tare weight shown in selected increment size.
ws0112	Last Demand Print Message	S1001	na	Last Demand Print Message for Scale
ws0113	Gross Weight at Last Print	D	na	The Resident Scale Task uses this to record the last printed weight and power-up weight, for use in the comparison logic for the weight-deviation print interlock.
ws0114	Current Scale Mode	S13	na	G = Gross. N = Net
ws0127	Total of Active Tare Record	D	na	Accumulated total of active or currently recalled Tare Table record.
ws0128	"n" of Active Tare Table Record	UL	na	n = number of transactions accumulated in active or currently recalled Tare Table record.
ws0132	Gross Weight Source String	S2	na	C = Gross weight that is the sum of the Net weight and Tare weight
ws0133	Current Hysteresis Status	Aby132		Hysteresis Preisach model status

2.1.2.2. Method

The Resident Scale Task maintains its scale process data in this block. This scale process data may change frequently, but must be stored permanently. The Scale Tare Setup section describes how the RST uses the tare process data in this block.

2.1.3. Scale Commands (WC)

Access:	"Operator" Level Access, customizable by individual field		
Class Code:	0x76	Data Type:	D
Instances:	1		

2.1.3.1. Attributes

wc0101	Pushbutton Tare Scale	Bl	rc	Application sets from 0 to 1 to trigger command
wc0102	Clear Scale	Bl	rc	Set from 0 to 1 to trigger command
wc0103	Print Scale	Bl	rc	Set from 0 to 1 to trigger command
wc0104	Zero Scale	Bl	rc	Set from 0 to 1 to trigger command
wc0105	Switch to Primary Units	Bl	rc	Set from 0 to 1 to trigger command

wc0106	Switch to Secondary Units	BI	rc	Set from 0 to 1 to trigger command
wc0107	Toggle Primary/Secondary units/3rd units	BI	rc	Set from 0 to 1 to toggle units
wc0112	Restart Filtering	BI	rc	Set from 0 to 1 to trigger command
wc0117	Toggle High-precision Weight	BI	rc	Set from 0 to 1 to toggle On / Off. Toggle high precision weight display & calculation setting to on/off. In legal-for-trade mode, high-precision weight display automatically switches back to normal display mode after 5 seconds
wc0118	Switch to 3rd units	BI	rc	Set from 0 to 1 to trigger command
wc0124	Print Total Report	BI	rc	Set from 0 to 1 to trigger command

2.1.3.2. Methods

For example, to issue a Tare Command to the scale, the Application sets Shared Data field wc0101 = 1.

After receiving the callback, the Resident Scale Task sets wx0101 = 1 to indicate the command is in progress. When the command is complete, the Resident Scale Task sets wx0101 = 0 to indicate the command is successful or wx0101 = 2 to 255 as an error code. It sets wc0101 = 0 so the Application can trigger the command again later. The Application can register a callback on wx0101 to monitor when the command is complete and to get the completion status of the command.

2.1.4. Scale Statuses (WX)

Access:	"Read Only" Access.		
Class Code:	0x75	Data Type:	D
Instances:	1		

2.1.4.1. Attributes

wx0101	Tare Scale Status	By	rt	0 = Tare completed successfully 1 = Tare in progress 2 = Scale in motion during tare 3 = Pushbutton tare not enabled 4 = Programmable tare not enabled 5 = Chain tare not permitted 6 = Only incremental chain tare permitted 7 = Tare not in rounded increment value 8 = Tare value too small 9 = Taring when power-up zero not captured 10 = Taring over capacity 11 = Taring under zero 12 = Tare value exceeds limit 13 = Must clear tare at gross zero 14 = Scale in expanded mode 98 = Invalid function parameter 99 = No SD access
wx0102	Clear Tare Status	By	rt	Same as Tare statuses, wx0101

wx0103	Print Status	By	rt	0 = Printing completed successfully 1 = Printing in progress 2 = Print connection not found 3 = Printing busy 4 = Printing error 5 = Not ready to print 6 = Scale in motion 7 = Scale overcapacity 8 = Scale under zero 9 = Printing request armed 10 = Ready to print 11 = Scale in expanded mode 12 = Scale bad zero 13 = USB export error during print 14 = Tare total overflow 15 = Target total overflow 16 = Printing USB export 75% 17 = Printing USB export 90% 18 = Printing USB export full 19 = Container tare total overflow 20 = Formula total overflow 98 = Invalid function parameter 99 = No SD access
wx0104	Zero Scale Status	By	rt	0 = Zero completed successfully 1 = Zero in progress 2 = Scale in motion during zero 3 = Illegal scale mode during zero 4 = Scale out of zeroing range 98 = Invalid function parameter 99 = No SD access
wx0105	Switch to Primary Units Status	By	rt	0 = Success, 1 = Command In Progress
wx0106	Switch to Secondary Units Status	By	rt	0 = Success, 1 = Command In Progress
wx0107	Toggle primary/secondary status/ 3rd unit	By	rt	0 = Success, 1 = Command In Progress
wx0112	Restart Filtering Status	By	rt	0 = Success, 1 = Command In Progress
wx0115	Write to EEPROM Status	By	rt	0 = Success, 1 = Command In Progress
wx0117	Toggle High Prec. Wt. Status	By	rt	0 = Success, 1 = Command In Progress
wx0118	Switch to Display of Aux Units	By	rt	0 = Success, 1 = Command In Progress
wx0131	Motion	Bl	rt	0 = No. 1 = Yes.
wx0132	Center of Zero	Bl	rt	0 = No. 1 = Yes.
wx0133	Over Capacity	Bl	rt	0 = No. 1 = Yes.

wx0134	Under Zero	Bl	rt	0 = No. 1 = Yes.
wx0135	Net Mode	Bl	rt	0 = No. 1 = Yes.
wx0137	Estimated Weight	Bl	rt	
wx0138	Weight Data OK	Bl	rt	0 = No. 1 = Yes.
wx0139	IDNET in Motion Error	Bl	rt	0 = No. 1 = Yes.
wx0141	Stored Weight Mode	Bl	rt	
wx0145	x10 Weight Display	Bl	rt	1 = x10 mode, 0 = normal mode
wx0146	MinWeigh LOW Indication	Bl	rt	1 = Net weight below MinWeigh threshold
wx0149	Power Up Zero not captured	Bl	rt	1 = NOT captured
wx0150	Zero request	Bl	rt	Zero request in Timed Zero function

2.1.4.2. Methods

The Resident Scale Task sets the first set of statuses to reflect the status of commands to the scale. The second set of statuses show the dynamic run-time status of the scale weight.

2.1.5. Working Scale Setup Data (WK)

Access:	"Supervisor" Level Access.
Class Code:	Data Type: PP
Instances:	1

2.1.5.1. Attributes

wk0101	Auto-Tare Threshold	D	rt	Sets in current primary units.
wk0102	Auto-Tare Reset Threshold	D	rt	Enabled by ct0105
wk0103	Auto-Clear Tare Threshold	D	rt	Enabled by ct0106
wk0104	Preset Tare	D	rt	Application can load weight value here to establish a preset tare.
wk0105	Rate Measurement Interval	By	na	0 = Every second. 1 = Every 5 seconds. 2 = Every ½ second.
wk0106	Rate Sample Time Interval	By	na	Number of intervals over which the IND500X averages the rate. Set from 1 to 60 intervals.
wk0116	Minimum Weight Safety Factor (MWsf)	D	na	Minimum Weight Safety Factor
wk0117	Process Tolerance	D	Na	Process Tolerance The relative weighing process tolerance applied to determine the Minimum Weight. **0 [default]**, 1 to 100
wk0118	Safety Factor	By	na	Safety Factor The safety factor in use to account for environmental influences on the weighing process, over time. **1 [default]** <= Safety Factor <=10

wk0119	MinWeigh Weight Value	D	Na	Minimum Weight Determined Value Weight for which the measurement uncertainty is equal to the process tolerance at the time of calibration. Unit: Primary unit.

2.1.5.2. Method

This block contains setup for data that may change during run-time. Rate, particularly, may change in a process control environment. However, for some features, these fields are static setup data that never changes.

RATE is the rate of change of weight normalized to the selected weight and rate units.

- cs--08 defines the rate weight units. cs--07 defines the rate time units in either seconds, minute, or hours.
- The Rate Measurement Interval in wk--05 specifies how often the IND500X calculates a new rate value. The permissible selections are 1 second, 5 seconds, and ½ second.
- The Rate Sample Time Interval is in wk--06. It is length of the sampling period used for the IND500X's Rate calculation. Permissible values are from 1 to 60 seconds. Rate calculates the "delta weight" or change in weight from the previous interval. Rate stores this new delta weight in an array of delta weights. It calculates the rate as an average delta weight over all intervals in most recent sample time. For example, if the sample time is set to 10 seconds and interval time is set to one second, the rate is the normalized average of the 10 most recent delta weights. Shorter sample times reflect more accurately the instantaneous changes in the rate, but often have much greater fluctuations in rate values. With longer sample times, the rate changes more slowly and smoothly because the rate is calculated over a longer time.
- The IND500X calculates the delta weights using the fine gross weight. It stores the calculated rate in wt--14 in the "fine" resolution. Rate rounds the displayed rate to the x10 resolution of the scale's division size. For example, if the scale weight resolution is xxx.x, then displayed rate resolution is xxx.xx. It stores the displayed rate as a string in the wt--08.

2.1.6. Scale Setup (CS)

Access:	"Service" Level Access, customizable by individual field		
Class Code:	0x67	Data Type:	PS
Instances:	1		

2.1.6.1. Attributes

cs0101	Scale Type	By	na	**A**nalog scale **I**DNet High Precision scale **C** = SI**C**Spro scale **N**one
cs0103	Scale ID	S21	na	Text Identifier name for scale
cs0104	Third Weight Units	By	na	0 = none, 1 = pounds, 2 = kilograms, 3 = grams, 4 = metric tons, 5 = tons, 9 = ounces, 10 = custom units

cs0105	Enable Permanent High Precision Wt.	Bl	na	0 = Disable. 1 = Enable. Enable high-precision weight display to include an additional decimal digit beyond the specified division size for permanent display on IDNET bases
cs0107	Rate Period (Time Units)	S2	rt	No, Sec, Min, Hour
cs0108	Rate Weight Units	By	na	0 = None, 1 = Primary, 2 = Secondary.
cs0112	Custom Units Name	S13	na	3 characters can be displayed on the terminal
cs0113	Custom Units Conversion Factor	D	na	
cs0114	Low-Pass Filter Corner Frequency	D	na	0 to 9.9 Hz. 0 = Disables filter. The filtering routines select the closest available filtering setting to your selection and write it back into this field.
cs0115	Low-Pass Filter Poles	By	na	2, 4, 6, 8
cs0116	Notch Filter Frequency	D	na	For Analog Scale Bases only. 0 to 99 Hz. The filtering routines select the closest available filtering setting to your selection and write it back into this field.
cs0118	Ultra-Stability Filter Enable	Bl	na	0 = Disabled. 1 = Enabled. Do not use with process weighing.
cs0120	Units Switch Enable	Bl	na	0 = Disabled. 1 = Enabled.
cs0121	Output Rate of Continuous Output	By	na	0 = Default (20 Hz) 1 = 20 Hz – High update rate for process control applications 2 = 10 Hz – Mid-speed update rate 3 = 5 Hz – Low update rate for transaction applications *Values other than 0, 1, 2, or 3 will result in a 20 Hz rate.
cs0125	Custom Units Increment Size	D	na	Custom Units Increment Size
cs0129	MinWeigh Feature	By	na	0 = Disabled. 1 = Enabled.
cs0132	Timeout	By	na	0 = Command is executed immediately regardless of motion. 1-98 = Terminal will wait from 1 to 98 seconds for motion before command is aborted. 99 = Terminal will wait indefinitely for a no-motion condition before executing command.
cs0173	Scale Class	By	na	1 = I, 2 = II, 3 = III (default), 4 = III HD, 5 = III L, 6 = IIII
cs0174	Verified Interval	By	na	0 = e = d (default), 1 = e = 10d

cs0175	Timed Zero	By	na	total time for Timed Zero to detect zero 0=disabled, 1=10, 2=15, 3= 30 minutes, 4-45 minutes, default is 0.
cs0176	Time Value Zero Request OFF	US	na	time of Zero Requested output OFF then ON constant, default value 200ms,
cs0177	Approval Seal Break Counter	S11	na	Text of Approval Seal Break Counter
cs0178	Approval Seal Break Counter	S16	na	Text of Approval Seal Checksum
cs0179	Center of Zero On or OFF	By	na	0=OFF, 1=ON
cs0180	Power-up timer	By	na	power up timer, 0=disabled, >0 = minutes to delay when power up for warming LC
cs0181	Platform Boot Code description	S60	na	Description of SICSpro base boot code

2.1.6.2. Methods

2.1.6.2.1. Filtering

The goal of filtering the weight counts is to remove the internal and external noise from the weight signal. Ideally, users of weight indication would like instant response to a weight input (settling time = 0), and immunity from all signal disturbances. In practice, in selecting a filter, you must trade off settling time and disturbance rejection to find an acceptable compromise.

There are two major classes of weighing applications: transaction and process weighing. In transaction weighing, a load to the scale base is more or less a step input, and the user only wants the actual static weight value of the load. Most shipping, vehicle, food, and service scales fall into this category. Settling time requirements typically range from 0.5 seconds in service scales to several seconds in vehicle or livestock scales. Disturbance rejection requirements vary widely within this weighing classification, but usually there is a need for a very stable final weight reading.

In process weighing, automation equipment or humans continuously add the load over some time. Even though only the final weight reading may be preserved, knowledge of the time varying weight reading is important during the weighing process. Batching, filling, and in-motion weighing fall into this category. Settling time requirements are usually more relaxed because the "final" settling time for a ramp input is less than that of the same load applied as a step input. Disturbance rejection is important since many types of automation equipment introduce vibrations. Stability of the "final" value is somewhat less important.

IND500X filtering has a large range of adjustment for both disturbance rejection and settling time to meet all Application requirements. Since these two parameters are dependent, some experimentation is usually required to find the best fit for the Application.

The following describes the Analog Load Cell Interface filtering. The IND500X Analog Scale Interface provides a 366 Hz A/D sampling rate, which permits highly effective digital filtering. Since most of the filtering is digital, it is easily adjusted over a wide range of selections via soft switch setup to meet specific site needs. IND500X has three types of configurable digital filters:

1. Low Pass Filter

All weighing applications use the low pass filter. The user can specify the corner frequency of the pass band and the slope of the transition band. The pass band extends from DC (0 Hz) to the corner frequency. The low pass filter accepts the frequencies within this low-pass range with little or no attenuation, but attenuates frequencies above the pass band according to the slope of the transition band.

The scale is measuring the DC signal (static weight), so it is tempting to make the corner frequency very low to reject all "noise". However, the narrower the pass band, the longer the delay or settling time before we get the final value. As the corner frequency is increased, the scale will settle faster, but will also allow more noise through.

The transition slope describes the rate of change of the attenuation once outside the pass band. The steeper the slope, the more effective a filter is at rejecting a disturbance that is near the corner frequency. Making the slope infinite will cut off all frequencies above the corner. Again the price is delay; the steeper the slope, the longer the settling time.

The IND500X provides a multi-pole Infinite Impulse Response (IIR) low pass digital filter, with Service Technician control over both the filter corner frequency and the sharpness of the transition band slope. The corner frequency is defined in Hz; its adjustment range is 0.1 through 9.9 Hz. The number of filter poles defines the band slope. There can be 2, 4, 6 or 8 poles. This large range of adjustability provides effective filtering for almost any situation.

2. Notch Filter

An ideal notch filter provides infinite attenuation at a single frequency, and little or no attenuation at other frequencies. This type of filter is useful in special cases where there is a single noise frequency near or below the corner frequency of the low pass filter. In such cases, use of the notch filter can provide additional attenuation for a troublesome noise source and may permit opening the pass band of the low pass filter for a faster step response. The IND500X implements the notch filter as a Finite Impulse Response (FIR) filter, and provides the fundamental notch plus additional notches at multiples of the fundamental notch frequency. Specifying the notch frequency in Hz adjusts the notch filter. The notch filter is applicable to all weighing applications, but only to the Analog Load Cell scale.

3. Ultra-Stability filter

Ultra-Stability Filtering algorithm is for use in transaction applications where it is very difficult to achieve stable weight readings due to excessive motion on the scales. Examples are truck scales in very windy locations and livestock weighing scales. The Ultra-Stability filtering algorithm uses the standard low-pass filtering as long as there is a rapid motion on the scale so that the operator can also observe the weight changing. When the motion begins to die down, this algorithm switches to a very stiff filter that strongly dampens any noise on the scale. Then, the operator can record a stable weight reading. Process weighing applications cannot use the ultra-stability filter, since the non-linear action of the filter switching may cause inaccurate cutoffs in batching or filling applications.

2.1.7. Scale Tare Setup (CT)

Access:	"Administrator" Level Access		
Class Code:	0xB7	Data Type:	PS
Instances:	1		

2.1.7.1. Attributes

ct0101	Tare Enabled	Bl	na	0 = Disabled. 1 = Enable Tare feature. Requires qc0149 be written to "1" to fully execute.
ct0102	Pushbutton Tare Enabled	Bl	na	0 = Disabled. 1 = Enabled.
ct0103	Keyboard Tare Enabled	Bl	na	0 = Disabled. 1 = Enabled.
ct0104	Auto-Tare Enabled	Bl	na	0 = Disabled. 1 = Enabled.
ct0105	Re-arm Auto Tare (Requires No Motion)	Bl	na	1 = Re-arm Auto Tare only when there is no motion after weight falls below Re-arm threshold (wk0102)
ct0106	Auto-Clear Tare Enabled	Bl	na	0 = Disabled. 1 = Automatically clear tare when weight falls below Auto-clear Weight Threshold (wk0103)
ct0107	Auto-Clear Tare after Print	Bl	na	0 = Disabled. 1 = Enabled.
ct0108	Auto-Clear Tare Motion	Bl	na	0 = Disabled. 1 = Enabled.
ct0112	Weights & Measures Interlock	Bl	na	0 = Disabled. 1 = Enabled.
ct0113	Net-Sign Correction Enabled	Bl	na	0 = Disabled. 1 = Enabled.
ct0114	Terminal tare enable	Bl	na	0 = Do IDNet tare. 1 = Terminal tare
ct0115	Additive tare enabled	Bl	na	0 = Disabled. 1 = Enabled.
ct0118	Reset tare on power-up	Bl	na	0 = Restart with current tare. 1 = Reset the tare to zero on power-up.
ct0119	Clear Tare on Zero	Bl	na	0 = Disabled. 1 = Clear Tare when scale is zeroed
ct0122	Tare Display	By	rt	0 = Disabled, 1 = Active (default), 2 = Always

2.1.7.2. Methods

Tare is the weight of an empty container. The IND500X can mathematically eliminate this weight from the gross weight and show only the contents, or net weight. The IND500X always displays the gross, net, and tare weights using the same display resolution and units. The IND500X always has tare weight available for recall and display, and it always identifies the tare weight. A tare weight of zero is illegal.

There are several methods for capturing tare:

Pushbutton Tare captures current weight reading as the tare weight upon operator command, at highest internal weight resolution available. There must be no motion on the scale for 3 seconds.

Auto-Tare captures the current weight as the tare weight when the current weight exceeds the upscale threshold weight, wk0101, and the scale reaches a "no motion" state. The IND500X resets the auto-tare trigger when the weight falls below a downscale threshold, wk0102, and the scale is in an optional stable weight condition. There must be no motion on the scale

The IND500X accepts a Keyboard Tare or a Programmable Tare at either display resolution or full internal resolution. The operator may recall tare on demand. Application specific software packages can set the Programmable Tare weight in wk--04. The IND500X rounds the Tare to the scale display resolution before using it in calculations. Canadian W&M requires keyboard tare to be entered at the scale display resolution.

Auto-Clear Tare operates in conjunction with Auto-Tare. It automatically clears the tare after the following sequence occurs: 1) weight exceeds an upscale weight threshold, 2) a stable reading is taken, 3) weight falls below Auto-Clear Tare threshold (wk0103), 4) Auto-Clear Tare is carried out. You may also set the IND500X to automatically clear tare after the IND500X prints.

Net Sign Correction delays the decision of which weighment is the gross weight and which weighment is the tare weight until a ticket is printed. At that time, the IND500X compares the two weighments and takes the lower weight as the tare weight, so the net weight is always a positive value. It resolves this dilemma:

Weigh a full truck first and, after emptying the truck, take the tare weight of the empty truck to find the net weight of the contents.

Take the tare weight of an empty truck first and, after loading the truck, take the full weight of the truck to find the net weight of the contents.

Tare Interlock, the only tare configuration field the Weights & Measures seal protects, enforces the following operations:

- Incremental chain tares only (Europe & Australia).
- Cannot perform chain tares (USA).
- Only capture tare in first range of a multi-range or multi-interval scale.
- Must capture Power-Up Zero before capturing a Tare weight.
- May clear Tare only at Gross Zero.

IDNET Tare Option. The IND500X enforces taking tare through the high precision base when the Legal-for-Trade switch is ON. The Legal for Trade switch option takes precedence over the setup selection to manage IDNet Tare within the IND500X rather than within the high-precision base.

For Multi-Interval weighing (Europe and Australia), you may take Pushbutton and Auto Tare in any interval. In Legal for Trade mode, Preset Tare entries must be within the lowest interval. The IND500X generates an error message when the entry is too large. If not in Legal for Trade mode, Preset Tare entries may be in any interval. In the U.S. Legal for Trade mode, all tare entries must be in the lowest weighing range.

2.1.8. Scale Zero Setup (ZR)

Access:	"Administrator" Level Access, customizable by individual field		
Class Code:	None	Data Type:	PC
Instances:	1		

2.1.8.1. Attributes

zr--01	Power-Up Zero Capture Positive Range	By	na	% of capacity (0-99)
zr--02	Power-Up Zero Capture Negative Range	By	na	% of capacity (0-99)
zr--03	Pushbutton Zero Positive Range	By	na	% of capacity (0-99)
zr--04	Pushbutton Zero Negative Range	By	na	% of capacity (0-99)
zr--05	Auto-Zero Maintenance Window	US	na	Number of 1/10th divisions for AZM Window. Legal values are 0 – 99 1/10th divisions. 0 = Disabled.
zr--06	Under-Zero Divisions	By	na	0-99 divisions. Number of divisions at which the under-zero indication is set on the display. "99" disables the under-zero display.
zr--07	Pushbutton Zero	By	na	0 = Disabled. 1 = Enabled
zr--08	Auto-Zero in Gross Mode	By	na	0 = Disabled. 1 = Enabled
zr--09	Auto-Zero in Gross & Net Mode	By	na	0 = Disabled. 1 = Enabled
zr--10	Zero-Indication in Gross Mode	By	na	0 = Disabled. 1 = Enabled
zr--11	Zero-Indication in Gross & Net Mode	By	na	0 = Disabled. 1 = Enabled
zr--12	Reset to Calibrated Zero on Power-Up	BI	na	0 = Restart with current zero, 1 = Reset to calibrated zero
zr--13	Timed Zero	By	na	Total time for Timed Zero to detect zero, in minutes. 0 = Disabled (default), 1 = 10, 2 = 15, 3 = 30
zr--15	Time Value Zero Request OFF	By	na	Time of Zero Requested output OFF then ON constant, default value 200ms
zr--99	EEPROM Block Checksum	US	na	

2.1.8.2. Methods

Zero is the interval between –0.5d and +0.5d, where "d" is a division or display increment.

Center of Zero is the interval between –0.25d and +0.25d in most market regions. In Canada, Center of Zero is the interval between -0.20d and +0.20d. Center of Zero is a Boolean system output that is TRUE when the display reading is in the center of zero range. IND500X evaluates Center of Zero at each new weight update. Metrology regulations usually require that the scale must show a Center of Zero status indication to the user at the primary weight display. Some jurisdictions require that the indication be present only while in gross weight mode, others require it in both gross and net mode.

When the service technician calibrates the scale, the IND500X records the Calibrated Zero reading internally. The IND500X also maintains a separate Current Zero reading that compensates for conditions that may change the scale so that it no longer indicates zero when the platform is empty. Such conditions include thermal effects and the accumulation of matter on the scale. The Center of Zero output is an indication of the quality of the Current Zero. There are several methods

available to establish a new Current Zero reading. In each case, there are limits applied to the acceptance of this command by the scale.

On system power up, the IND500X automatically attempts to establish a new Current Zero. The Power-up-Zero logic establishes a Current Zero when the present scale reading is stable and falls within the allowed tolerance from Calibrated Zero. This Power-up-Zero tolerance is the percentage of the scale capacity, specified for (+) and (–) tolerance limits. The service technician can disable Power-up-Zero.

Either the operator or a remote device can also attempt a Pushbutton Zero command. This command succeeds if the scale reading is stable and falls within its allowed tolerance from the Calibrated Zero. The Pushbutton Zero tolerance limits are a percentage of scale capacity, specified for (+) and (–) tolerance limits. The service technician can disable Pushbutton Zero.

The IND500X also provides Automatic Zero Maintenance or AZM. Within the AZM operating range, the IND500X makes small adjustments to the Current Zero reading to drive the weight reading toward true numeric zero. This feature operates only within a small range around true zero. The AZM moves toward zero at a rate of correction (correction amount per unit time) of 0.07 increments per second. zr0105 configures the operating range of this feature in number of scale increments. Setting zr0105 to 0 disables Automatic Zero Maintenance.

Under-Zero Divisions are the maximum number of display increments below zero that the scale will operate. When the weight falls below the Under-Zero Divisions, the weight display shows only an error display, the Under Zero logical status output is TRUE, and IND500X indicates that the weight transmitted is invalid. Setting the Under-Zero Divisions to 99 disables the under-zero check.

IDNET Power-Up Restart sets the power up operation of the IDNET base. When Restart = Disabled, the IND500X/high precision base clears the current tare and enforces a re-zeroing of the base after a restart of the base. When Restart = Enabled, the IND500X terminal/high precision base preserves the current zero and tare values after a restart of the base.

The IND500X protects the Zero Configuration Settings when the Weights and Measures seal is in place.

2.1.9. Scale Totalization Process Data (TZ)

Access:	"Supervisor" Level Access.		
Class Code:		Data Type:	PP
Instances:	1		

2.1.9.1. Attributes

tz0101	Grand Total Weight	D	na	Displayed in primary units only.
tz0102	Grand Total Transaction Counter	UL	na	
tz0103	Subtotal Weight	D	na	Displayed in primary units only.
tz0104	Subtotal Transaction Counter	UL	na	

2.1.9.2. Method

Each time a Demand Print transaction occurs, the IND500X adds the weight value to the totalization for the scale according to the setup selections in the TS block.

2.1.10. Totalization Setup (TS)

Access:	"Supervisor" Level Access. ts0101 and ts0100 are "Maintenance" level.
Class Code:	Data Type: PS
Instances:	1

2.1.10.1. Attributes

ts0101	Grand Total Enable	By	na	Automatically add Demand Print weight to Grand Total weight: 0 = No, 1 = Gross Weight, 2 = Net Weight.
ts0102	Clear Grand Total on Totals Print	BI	na	0 = No. 1 = Clear the Grand Total after printing the Grand Totals.
ts0103	Subtotal Enable	By	na	Automatically add Demand Print weight to Subtotal weight: 0 = No, 1 = Gross Weight, 2 = Net Weight.
ts0104	Clear Subtotal on Totals Print	BI	na	0 = No, 1 = Clear the Subtotal after printing the Subtotals.
ts0105	Weight Unit for Total Weight Value	By	na	1 = lb, 2 = kg [default], 3 = g, 4 = t, 5 = ton, 9 = oz

2.1.10.2. Method

Each time a demand print transaction occurs, the IND500X adds the weight value to the Totalization for the scale according the setup selections in this block. Scale Grand Totals, Subtotals, and Sequential Numbers are stored in the Process Data (TZ) block.

2.2. Calibration and Monitoring

2.2.1. Scale Calibration (CE)

Access:	"Administrator" Level Access, customizable by individual field
Class Code:	0x72 Data Type: PC
Instances:	1

2.2.1.1. Attributes

ce0103	Primary Units	By	na	0 = none 1 = pounds 2 = kilograms	3 = grams 4 = metric tons 5 = tons

Hysteresis Compensation-Related Shared Data

ce--56	Hysteresis Calibration Enabled	BI		0 = no, 1 = yes

ce--57	Xlow Hysteresis Calibration Counts	L		Additional hysteresis calibration point for non-linear scale bases
ce--58	Low Hysteresis Calibration Counts	L		Additional hysteresis calibration point for non-linear scale bases
ce--59	Mid Hysteresis Calibration Counts	L		Additional hysteresis calibration point for non-linear scale bases

Multi-Range Parameters

ce0104	Number of Ranges/Intervals	By	na	1 = 1 range, 2 = 2 ranges, 3 = 3 ranges, 4 = 2 intervals, 5 = 3 intervals
ce0105	Low Range Increment Size	D	na	Increment size is in Calibration units
ce0106	Mid-Range Increment Size	D	na	Multi-ranging parameters are in Calibration units.
ce0107	High Range Increment Size	D	na	Multi-ranging parameters are in Calibration units.
ce0108	Scale Capacity in Single Range Setup or Low-Mid Range Threshold Switch point	D	na	Scale capacity when only one range is enabled. Units are the same as Calibration units.
ce0109	Mid-High Range Threshold Switch point	D	na	Multi-ranging parameters are the same as Calibration units.
ce0110	Highest Capacity in Multiple Range Setups	D	na	Scale capacity units are the same as Calibration units
ce0111	Secondary Units	By	na	0 = none, 1 = pounds, 2 = kilograms, 3 = grams, 4 = metric tons, 5 = tons, 9 = ounces, 10 = custom units

Calibration Parameters

ce0119	Calibration Units	By	na	0 = none 1 = pounds 2 = kilograms	3 = grams 4 = metric tons 5 = tons

Standard Linear Calibration Points

ce0120	Zero Calibration Counts	L	na	Zero calibration point for all scales
ce0121	High Calibration Counts	L	na	High calibration point for all calibrated scale bases. Weight is in calibration units
ce0122	High Calibration Weight	D	na	Units as set in ce0119.

First Point of Calibration for Non-Linearity

ce0123	Mid Calibration Counts	L	na	Calibration point for non-linear scale bases with 1, 2, or 3 points of non-linearity.
ce0124	Mid Calibration Weight	D	na	Weight is in calibration units.
ce0125	Calibration Gravity "Geo" Code	By	na	Value 0 – 31 This value represents the gravitational acceleration depending on the latitude and altitude of the specific location where the IND500X was last calibrated. The IND500X uses it to adjust the calculated weight value when you calibrate the IND500X in one location and operate it in a different region of the world. Any value other than 0-31 disables this feature.

ce0126	Motion Stability Sensitivity	US	na	Sensitivity in tenths (1/10) of divisions
ce0127	Motion Stability Time Period	US	na	Time in tenths of seconds
ce0132	Over Capacity Divisions	By	na	# of display increments that the terminal is allowed to go over capacity. Available for analog load cells only.
ce0133	# of Upscale Test Points	By	na	1, 2, 3, or 4. Typically, there is only one upscale calibration point. For non-linear scale bases, two additional calibration points can help correct for the non-linearity. You may also use these additional "non-linearity" points to see more weight resolution in the higher ranges of a multi-ranging scale.
ce0134	Over Capacity Blanking	Bl	na	0 = "Disabled". Sets divisions to 99 on terminal display only. 1 = Enabled. Scale display blanks when weight exceeds the capacity of the scale plus the over capacity divisions stored in ce0132.
ce0137	Last Calibration Date & Time	AL2	na	In 1 second interval.
ce0138	Base Serial Number	ABy14	na	Serial # of Scale Base. Each character stored in ASCII decimal values.

Second Point of Calibration for Non-Linearity

ce0139	Low Calibration Counts	L	na	Additional Calibration point for non-linear scale bases with 2 or 3 points of non-linearity.
ce0140	Low Calibration Weight	D	na	Weight is in calibration units.

CALFREE Calibration Parameters

ce0141	Use Calculated Calibration	Bl	na	0 = No. 1 = Yes.	
ce0142	Load Cell Capacity	D	na	Load Cell Sensor Capacity (example: 5000 kg)	
ce0143	Load Cell Capacity Units	By	na	1 = pounds 2 = kilograms 3 = grams	4 = metric tons 5 = tons
ce0144	Rated Load Cell Output	D	na	Sensor output at the rated capacity weight, in mV/V (example 2.0 mv/V)	
ce0145	Gain Jumper	By	na	2 = 2mv/V 3 = 3mV/V (default)	
ce0146	Estimated Preload	D	na	Estimated preload is optional. If entered, the system can check for saturation of the A/D input.	
ce0147	Estimated Preload Units	By	na	1 = pounds 2 = kilograms 3 = grams	4 = metric tons 5 = tons
ce0148	Calculated Calibration Gravity "Geo" Code	By	na	Gravity "Geo" code of factory that calibrated load cell. Values are 0 – 31.	
ce0149	Calculated High "Geo"	D	na		

Third Point of Calibration for Non-Linearity

ce0150	XLow Calibration Counts	L	na	Additional Calibration point for non-linear scale bases with 3 points of non-linearity.

ce0151	XLow Calibration Weight	D	na	Weight is in calibration units.
ce0155	Calibration High "Geo"	D	na	
ce0199	EEPROM Block Checksum	US	na	

2.2.1.2. Methods

Motion/Stability is a measure of whether the weight has settled on the scale. Metrology regulations generally prohibit a weighing system from recording a measurement before the system has settled. The RST uses the Scale Motion/Stability status as an interlock for triggering a Pushbutton Tare command or for triggering a Print command. The IND500X examines the weight readings over a period of time to determine Motion/Stability of a scale. The weight readings over a chosen interval of time T must not differ from one another by more than the tolerance value V. The Service Technician can set the level for motion detection.

Over-Capacity Divisions are the number of display increments beyond the nominal scale capacity that the scale will operate. When the weight display exceeds the Over-Capacity Divisions, the weight display shows only an error display, the Over-Capacity logical status output is TRUE, and IND500X indicates that the weight transmitted is invalid. The Service Technician cannot disable the Over-Capacity checking.

The Units of Measure that the IND500X fully supports are:

- MKS – metric tons (t), kilograms (kg), grams (g)
- Avoirdupois – tons (ton), pounds (lb)
- troy ounces (toz), pennyweights (dwt), ounces (oz), and custom units as secondary units only
- The IND500X uses these fully supported units, as follows:
- Calibration Units define the units of calibration test weights.
- Primary Units are the preferred units of measure.
- Secondary Units are the alternate units when using units switching function. The IND500X can also display the Secondary units on the main display

With Multiple Range weighing, there can be up to three weighing ranges and each has a threshold. Each weighing range extends from zero to its range threshold. Each range has an associated increment size. The increment size and threshold value are larger for each successive weighing range from the lowest to highest ranges. The difference between the largest and smallest increment size is at most one decimal place. You manually set the increment sizes and thresholds in setup.

The IND500X only supports automatic selection of the "current weighing range". When weight is increasing, the current weighing range proceeds from the lower range to the next higher range once the weight exceeds the range threshold. Switchover to the next higher range occurs at the range threshold. When weight is decreasing, the current weighing range returns from the current weighing range to the lowest range only when the weight falls within half-a-division of zero.

The IND500X weight display must clearly indicate the current weighing range. The terminal indicates weighing ranges 1, 2, and 3 respectively. The terminal maintains the same decimal point position in the Displayed Weight even when the current weighing range changes. There is, at most, one trailing, non-significant "0". When right of the decimal point, the non-significant "0" must be in

the third place to the right of the decimal point. You may take a Tare in any weighing range. The Displayed Weight and Printed Weight are always the same.

In Gross Mode, the IND500X determines the current weighing range by comparing the Fine Gross Weight to the range thresholds. If the scale is within half-a-division of zero, the terminal returns to the lowest weighing range as the current weighing range. The IND500X calculates the Displayed Gross Weight by rounding the Fine Gross Weight to the nearest weight increment for the current weighing range.

In Net Mode, the terminal determines current weighing range by comparing the Fine Gross Weight to the range thresholds. If the scale is within half-a-division of zero for gross mode, the terminal returns to the lowest weighing range as the current weighing range. The IND500X terminal calculates the Displayed Net Weight by rounding the Fine Net Weight to the nearest weight increment for the current weighing range. The IND500X calculates the Displayed Tare Weight by rounding the Fine Tare Weight to the nearest weight increment for the current weighing range. Displayed Gross Weight = Displayed Tare Weight + Displayed Net Weight.

Multi-Interval weighing rules only apply when the scale base is a high precision base. There can be up to three weighing intervals. Each weighing interval has a threshold. Each weighing interval extends from the threshold of the next lower interval to its threshold. Each interval has an associated increment size. The increment size and threshold value are larger for each successive weighing interval from the lowest to highest intervals. The high precision base sets the increment sizes and thresholds. The terminal only supports automatic selection of the "current weighing interval". The IND500X display must clearly display the current weighing range. Displayed Weight and Printed Weight are always the same.

In Gross Mode, the IND500X determines the current weighing interval by comparing the Fine Gross Weight to the interval thresholds. The terminal calculates the Displayed Gross Weight by rounding the Fine Gross Weight to the nearest weight increment for the current weighing interval.

In Net Mode, the IND500X determines the "net weight current weighing interval" by comparing the Fine Net Weight to the interval thresholds. It calculates the Displayed Net Weight by rounding the Fine Net Weight to the nearest weight increment for the "net weight current weighing interval". The terminal determines the "tare weight current weighing interval" by comparing the Fine Tare Weight to the interval thresholds. It calculates the Displayed Tare Weight by rounding the Fine Net Weight to the nearest weight increment for the "tare weight current weighing interval". Displayed Gross Weight = Displayed Tare Weight + Displayed Net Weight.

2.2.1.2.1. Weights & Measures Compliance

Automatic Multi-Ranging is not compliant with the U.S. and Canadian regulations for Legal for Trade operation.

2.2.1.2.2. Calibration

The IND500X supports seven modes of scale calibration. These are:

- Standard, Two-Point Linear Calibration is the standard mode for calibrating the large majority of scales. You measure the scale counts at the zero weight and at a span weight of the scale.
- Three Point Calibration enables calibration of a scale with one intermediate point of non-linearity.

- Four Point Calibration enables calibration of a scale with two intermediate points of scale non-linearity.
- Five Point Calibration enables calibration of a scale with three intermediate points of scale non-linearity.
- CALFREE measures to zero weight of the scale and calculates the span value of the scale based on the weighing parameters of the load cell and the analog A-to-D circuitry.
- Zero Adjust Calibration adjusts only the zero value of the scale. It is valid for use with all modes of calibration.
- Span Adjust Calibration adjusts only the span value of the scale in a standard, two-point linear calibration.

2.2.1.2.3. Calculated Calibration for Analog Load Cell Weighing Systems

Calibration using test weights is difficult or even impossible for large tank or hopper scales used in process weighing applications. Establishing a zero balance is easy, but it is frequently difficult to place a significant amount of calibrated test load on the scale. Service technicians routinely calibrate such scales in the field with test loads of less than 5% of scale capacity. Then, they use a "step test" using water or some other cheap material as a rough check of linearity performance. This type of span calibration is often less accurate than a mathematically calculated field calibration. When service technicians cannot apply test weights to a tank scale, they must use calculated field calibration (CalFree) as the only recourse.

CalFree calculated calibration requires that both the sensor(s) and the A/D converter be independently calibrated and their output gains known. As an added benefit, if the factory calibrates both the A/D converter and sensors with sufficient accuracy, service technicians can replace either device in the field with another device of the same type without performing a new field calibration.

The factory must calibrate the A/D converter to a common and known gain and offset for all devices of its type. The factory calibrates all IND500X Terminal A/D converters at two points:

Load Cell Input	Terminal Output
0 mV/V	0 counts
2 mV/V	1,000,000 counts

After factory calibration, all such devices have an A/D gain = 500,000 counts / mV/V. The factory must calibrate the A/D converter for each jumper setting of 2 mv/V and 3 mv/V. Refer to "bc" block definition.

The second requirement is that the factory calibrates the sensor device(s) and publishes the output gain. We express the load cell sensor gain as electrical output in mV/V at the rated mechanical input, typically in units of mass in pounds or kilograms. When you mount multiple identical load cells mechanically in parallel, the total sensor gain is the same as the gain for any one cell. This is typical for most multi-cell scales.

> Example: The customer constructs a hopper scale using three load cells, each rated at 2 mV/V output, 10,000 lb capacity. The service technical usually trims the load cells for zero output balance at no load, so:

Sensor gain = electrical output / mechanical input

= (0.0002 mV/V) / lb

Finally, the service technician must know the desired system capacity and units of measure.

Example: The desired system capacity is 5,000 kg.

System gain = (A/D gain) x (Sensor gain) x (Units Conversion)

= 500,000 counts/mV/V x 0.0002 mV/V/lb x 2.20462 lb/kg

= 220.462 counts/kg

While performing this computation, also the IND500X can also check for A/D saturation at full capacity. In order to perform this test, the service technician must provide the excitation voltage and an estimated preload weight. In actual operation, the weighing indicator replaces the estimated preload with an accurate field zero adjustment.

The IND500X excitation voltage is 10V. Assume that the hopper preload is 4500 kg (very large preloads are common in process weighing).

Full output = (preload + capacity) x (Sensor gain) x (Units Conversion) x (excitation voltage)

= 9,500 kg x 2.20462 lb/kg x 0.0002 mV/V/lb x 10V

= 41.9 mV

The IND500X will accept ~21 mV before saturation. This scale will not work properly for loads above 10% capacity!

2.2.1.2.4. Shortcomings and Warnings

In some cases computed calibration is ineffective or can operate in undesired ways:

- If the A/D converter provides multiple field selectable gain settings, such as a jumper to select 2mV/V or 3 mV/V load cells, the service technician must know the actual field gain selection. The weighing indicator must account for the differences in the calculations. Further, since such gain adjustment is not perfect, the factory must calibrate the A/D converter for each setting.
- Some junction boxes include potentiometers in each load cell's excitation or output wiring to allow field adjustment for corner errors. Since these resisters destroy all hope for accurate computed calibration, the service technician must disable them. There is little point to corner shift adjustment capability if the service technician cannot place test loads on the scale.
- A barrier device placed in the load cell wiring will usually cause severe gain and offset changes. For example, this often occurs when the load receiver is in a hazardous area. If the barrier is well characterized, we can include these factors in the calculations. However, since this is almost never the case, we must revert to revert to field calibration with test loads.
- Since A/D factory calibration is numeric only, results are highly accurate and repeatable. System accuracy remains virtually unaffected when swapping like A/D devices in the field without field calibration. Load cell calibration is analog in nature and difficult to perform with perfect accuracy. Maintaining system accuracy is correspondingly less certain when the service technician replaces a load cell. You must consult the vendor specifications for load cell trim to determine the system accuracy impact.

- The IND500X protects the Calibration Settings when the Weights and Measures seal is in place.
- The maximum capacity can be acceptable is 2000000.
- The increment can be acceptable is from 0.00001 to 500.0.
- Each range division can be acceptable is form 100d to 100000d
- The increment size and threshold value are larger for each successive weighing range from the lowest to highest ranges.
- The difference between the largest and smallest increment size is at most one decimal place.

2.2.2. Scale Monitoring & Service Data (WM)

Access:	"Read Only" Access.		
Class Code:	0xAB	Data Type:	PP
Instances:	1		

2.2.2.1. Attributes

wm0103	Number of weighments since calibration	UL	na	Must have a value set in Calibration Management/Test Interval # of Weighments (cm0104) in order for this field to be active.
wm0104	Number of Platform Overloads	UL	na	
wm0106	Number of Zero Commands	UL	na	
wm0107	Number of Zero Command Failures	UL	na	
wm0111	Calibration Check Failure	By	na	0 = None. 1 = Last calibration failed.
wm0112	Number of Platform Underloads	UL	na	
wm0113	Scale Accumulation Total	D	na	Total transaction weight accumulation for the scale base.
wm0116	Total Number of Weighments	UL	na	Total Number of Weighments/Transactions.
wm0119	Last Transaction Day	AL2	na	Last day that the scale base ran at least one transaction.
wm0120	Total Transactions Per Day	AL7	na	Total number of Print Transactions in each of the last 7 days when the scale base ran at least one transaction.
wm0121	Transaction Day Pointer	By	na	Pointer to the next transaction day the IND500X will update Values 1-7.
wm0122	Last Used Day	AL2	na	Last day that the scale base ran at least one cycle.

wm0123	Usage Cycles Per Day	AL7	na	Usage cycle counter. Contains the number of times that the scale base exceeds 1% of the capacity of the base in each of the last 7 days when the scale base had at least one cycle.
wm0124	Usage Cycle Day Pointer	By	na	Pointer to the next usage cycle day entry the IND500X will update. Values 1-7.
wm0125	Average Peak Load	D	na	Running average of daily peak load. IND500X stores value in primary units.
wm0126	Usage Time Counter	UL	na	Cumulative use time in minutes. Contains the cumulative minutes for which the scale base weight is above 1% of the scale capacity.
wm0127	Peak Load Per Day	D	na	Peak load on the scale base for one of the last 7 days when the scale base ran at least one use cycle.
wm0128	Peak Load Per Day	D	na	Peak load on the scale base for one of the last 7 days when the scale base ran at least one use cycle.
wm0129	Peak Load Per Day	D	na	Peak load on the scale base for one of the last 7 days when the scale base ran at least one use cycle.
wm0130	Peak Load Per Day	D	na	Peak load on the scale base for one of the last 7 days when the scale base ran at least one use cycle.
wm0131	Peak Load Per Day	D	na	Peak load on the scale base for one of the last 7 days when the scale base ran at least one use cycle.
wm0132	Peak Load Per Day	D	na	Peak load on the scale base for one of the last 7 days when the scale base ran at least one use cycle.
wm0133	Peak Load Per Day	D	na	Peak load on the scale base for one of the last 7 days when the scale base ran at least one use cycle.
wm0134	Peak Load Since Master Reset	D		Peak load on scale since the last master reset was performed.
wm0141	Number of Key Presses – C	UL	na	Records the number of key presses from the C, P, T, Z and ENTER keys
wm0142	Number of Key Presses – P	UL	na	
wm0143	Number of Key Presses – T	UL	na	
wm0144	Number of Key Presses – Z	UL	na	
wm0145	Number of Key Presses – ENTER	UL	na	
wm0146	Number of Weighments Since Calibration	UL	na	For GWP Sensitivity Test.

wm0147	Calibration Check Failure	By	na	0 = None, 1 = Latest Calibration
wm0148	Number of Weighments Since Calibration	UL	na	For GWP Eccentricity Test.
wm0149	Calibration Check Failure (Eccentricity Test)	By	na	0 = None, 1 = Latest Calibration
wm0150	Number of Weighments Since Calibration	UL	na	For GWP Repeatability Test.
wm0151	Calibration Check Failure (Repeatability Test)	By	na	0 = None, 1 = Latest Calibration
wm0152	Current Battery Voltage	D	na	
wm0153	Current Excitation Voltage	D	na	
wm0154	Current Shared Data Server Login	By	na	Number of current SDS logins.
wm0155	# of FACT failures	By	na	# of FACT failures from R-Brick base. It will trigger an error/warn when it reaches 3. A success of FACT will reset this value to 0.
wm0156	Last peak weight event Date	AL2	na	In 1 second intervals since 1970 this is the last date to detect peak weight. The date of the most recent peak weight.
wm0157	Last Platform Overloads Date	AL2	na	In 1 second intervals since 1970. this is the last date to detect platform overloads. The date of the most recent Platform Overloads.
wm0158	Last Platform Underloads Date	AL2	na	In 1second intervals since 1970. this is the last date to detect platform underloads. The date of the most recent Platform underloads.
wm0159	Last Zero Command Failure Date	AL2	na	In 1 second intervals since 1970. this is the last date to detect zero command failure. The date of the most recent zero command failure.
wm0160	Total Weighments	UL	na	Total Number of Weighments to support a manual reset
wm0161	Peak Weight	D	na	Peak Load on scale to support a manual reset
wm0162	Platform Overloads	UL	na	Number of Platform Overloads to support a manual reset
wm0163	Zero Commands	UL	na	Total Number of of Zero Commands to support a manual reset
wm0164	Zero Command Failures	UL	na	Total Number of Zero Command Failures to support a manual reset

2.2.2.2. Method

All fields except for wm0112 will reset to zero (0) upon Master Reset.

The Scale Monitor counts significant processing events and errors. The Scale Monitoring Setup Block (CM) defines what events the Scale Monitor watches. An FTP Shared Data transfer can save these usage counters but does not restore them.

3 Application Data

The Shared Data fields listed here in "Application Data" are fields that are available for use when creating Task Expert custom programming to run with **the basic firmware** for the IND500X. When **application software pacs** are installed in the IND500X terminal, many of the application shared data variables in the chapter will have been used for those specific applications and may not be available to Task Expert.

Refer to Chapter 9 (Fill-500x Application Software) for Application Data fields that have been used in the Fill-500x Application software. When using TaskExpert custom programming, these Fill-500x specific fields will be unavailable for use by the TaskExpert custom program.

3.1.1. Application Dynamic Integer Fields (AI)

Access:	"All Users" Access		
Class Code:	0x6E	Data Type:	D
Instances:	1		

3.1.1.1. Attributes

ai0101 to ai0199	Integer Fields 1-99	US	rt	Application may use these fields to exchange dynamic data

3.1.1.2. Methods

Applications may use this block of Shared Data for storing Dynamic integer fields. One use is exchanging integer data with remote tasks over PLC or TCP/IP communications.

3.1.2. Application Dynamic Floating Point Fields (AJ)

Access:	"All Users" Access		
Class Code:	0x6D	Data Type:	D
Instances:	1		

3.1.2.1. Attributes

aj0101 to aj0199	Floating Point Fields 1-99	D	rt	Application may use these fields to exchange dynamic data

3.1.2.2. Methods

Applications may use this block of Shared Data for storing Dynamic floating point fields. One use is exchanging floating point data with remote tasks over PLC or TCP/IP communications.

3.1.3. Application Dynamic String Fields (AK)

Access:	"All Users" Access		
Class Code:	0x6B	Data Type:	D
Instances:	1		

3.1.3.1. Attributes

ak0101 to ak0199	String Fields 1-99	S101	rt	Application may use these fields to exchange dynamic data

3.1.3.2. Methods

Applications may use this block of Shared Data for storing Dynamic string fields. One use is for exchanging string data with remote tasks over PLC or TCP/IP communications.

3.1.4. Application Dynamic Character Arrays (AL)

Access:	"All Users" Access		
Class Code:	0x6C	Data Type:	D
Instances:	1		

3.1.4.1. Attributes

al0101 to al199	Character Array Fields 1-99	ABy50	rt	Application may use these fields to exchange dynamic data

3.1.4.2. Methods

Applications may use this block of Shared Data for storing Dynamic string fields. One use is exchanging an array of binary data with remote tasks over PLC or TCP/IP communications.

3.1.5. Application Virtual Console Messages (AM)

Access:	"All Users" Access		
Class Code:		Data Type:	D
Instances:	3	The Control Panel uses instance 1 Applications use instances 2 and 3.	

3.1.5.1. Attributes

am--01	Unicode LPRINT Message	S1000	na	
am--02	Trigger to Begin LPRINT	By	rc	Set to 1 to initiate LPRINT command
am--03	LPRINT Complete Status	By	rt	0 = print in progress 1 = LPRINT command complete 2 = LPRINT command failure.
am--04	LPRINT Debug Data Override	By	na	Set to 1 to begin data debug on LPRINT printer
am--05	Application Console Out Message	S200	rt	Application Output Messages for display on Virtual Console display

am--06	Application Console In Message	S100	rt	Application Console Messages that are input from a Virtual Console keyboard
am--07	Trigger to Begin Console Print	By	rc	Set to 1 to begin Console Print
am--08	Console Print Complete Status	By	rt	1 = Console Print complete
am--09	Keyboard Data Ready Trigger	By	rc	1 = Keyboard Data ready

3.1.5.2. Methods

An Application can use this structure to send and receive messages from a Virtual Console. The Virtual Console consists of input messages from a Virtual Console keyboard, a Virtual Console display, and a Virtual Console LPRINT device.

When LPRINT messages can span multiple blocks, the start of the print message must contain the <dprint> tag and the end of the message must contain the </dprint > tag. The Application begins the LPRINT by setting 1 in the "begin print" trigger. It must wait until it sees the print complete status before setting another LPRINT block into Shared Data.

3.1.6. Application Integer Process Data (AP)

Access:	"Maintenance" Level Access.		
Class Code:	0x7D	Data Type:	PP
Instances:	1		

3.1.6.1. Attributes

ap0101 to ap0399	Integer Fields 1-99	US	rt	Application may use these fields to exchange dynamic data

3.1.7. Application Installation Information (AQ)

Access:	"Supervisor" Access	
Class Code:		Data Type: PS
Instances:	20	Instances 1–12 - TaskExpert Applications Instance 13 – TaskExpert Application called from Setup Tree Instance 18 - Upgrade Instance 19 - Resident Scale Task Instance 20 - Control Panel

3.1.7.1. Attributes

aq--01	Application Type	By	na	0 = None 1 = Control Panel	2 = Reserved 4 = Task Expert
aq--02	Application Name	S21	na	Application File Name	
aq--03	Part Number	S14	na		
aq--04	Software Number	S14	na		
aq--07	Enable Auto-Start	BI	na	1 = Enable Auto-Start of Application	
aq--08	Enable Manual Start	BI	na	1 = Enable Manual-Start of Application from Softkey Manager	

aq--09	Enable Manual Stop	Bl	na	1 = Enable Manual-Stop of Application from Softkey Manager
aq--10	Enable Console for Application	By	na	1 = Enable Front Console for the Application
aq--11	Virtual Console Instance	By	na	0 = None, 1, 2, or 3. am--00 instance that is the Virtual Console for this application

3.1.7.2. Method

This block contains identification, security, and location information for each application pack or Task Expert application installed in the IND500X. The IND500X will only start the applications identified in this list. Each application must have a valid security code.

Instance 1-3 are for Task Expert applications.

Instance 4 is the Custom Setup application for the Task Expert applications. The name of the application is TEsetup.cpt.

3.1.8. Application Dynamic Statuses (AS)

Access:	"All Users" Access		
Class Code:	0x79	Data Type:	D
Instances:	1		

3.1.8.1. Attributes

as0101	Statuses 1-99	By	rt	Statuses enabling Application to respond to Commands.
as0101	Assigned discrete input	By	rt	*OK to Weigh-in
as0102	Assigned discrete input	By	rt	*OK to Weigh-out
as0111	Assigned discrete output	By	rt	*Alarm
as0112	Assigned discrete output	By	rt	*Auxiliary Out
as0113	Assigned discrete output	By	rt	*Dump
as0114	Assigned discrete output	By	rt	*Holding
as0115	Assigned discrete output	By	rt	*Material 1
as0116	Assigned discrete output	By	rt	*Material 2
as0117	Assigned discrete output	By	rt	*Material 3
as0118	Assigned discrete output	By	rt	*Material 4
as0119	Assigned discrete output	By	rt	*Out of Tolerance
as0120	Assigned discrete output	By	rt	*Ready
as0121	Assigned discrete output	By	rt	*Running
as0122	Assigned discrete output	By	rt	*Weigh-In Fast Feed
as0123	Assigned discrete output	By	rt	*Weigh-In Feed
as0124	Assigned discrete output	By	rt	*Weigh-Out Fast Feed
as0125	Assigned discrete output	By	rt	*Weigh-Out Feed
as0126	Assigned discrete output	By	rt	*Fill Start Delay
as0127	Assigned discrete output	By	rt	*After Weigh Delay
as0128	Assigned discrete output	By	rt	Complete: Cycles

as0129	Assigned discrete output	By	rt	Complete: Weigh-in
as0130	Assigned discrete output	By	rt	Complete: weigh-out
as0131	Assigned discrete output	By	rt	Fill M1 Fast
as0132	Assigned discrete output	By	rt	Fill M1 Feed
as0133	Assigned discrete output	By	rt	Fill M2 Fast
as0134	Assigned discrete output	By	rt	Fill M2 Feed
as0135	Assigned discrete output	By	rt	Fill M3 Fast
as0136	Assigned discrete output	By	rt	Fill M3 Feed
as0137	Assigned discrete output	By	rt	Fill M4 Fast
as0138	Assigned discrete output	By	rt	Fill M4 Feed
as0139	Assigned discrete output	By	rt	Fill M5 Fast
as0140	Assigned discrete output	By	rt	Fill M5 Feed
as0141	Assigned discrete output	By	rt	Fill M6 Fast
as0142	Assigned discrete output	By	rt	Fill M6 Feed
as0143	Assigned discrete output	By	rt	*Material 5
as0144	Assigned discrete output	By	rt	*Material 6

3.1.8.2. Methods

Applications may use this block of Shared Data for setting Dynamic statuses. One use is communicating status data with remote tasks over PLC or TCP/IP communications.

3.1.9. Application String Field Setup (AZ)

Access:	"Maintenance" Level Access.
Class Code:	
Instances:	1

3.1.9.1. Attributes

az0101 to az0150	String Setup Fields 1-50	S101	na	

3.1.10. TaskExpert Application Start and Stop Triggers (AT)

Access:	"All Users"		
Class Code:	0x97	Data Type:	D
Instances:	20	1 instance for each application corresponding to the applications instances defined in AQ block	

3.1.10.1. Attributes

at--01	Start Application	Bl	rc	1 = Start the application defined in the corresponding entry of the AQ block
at--02	Stop Application	Bl	rc	1 = Stop corresponding AQ application

at--03	Pause/Suspend Application	BI	rc	1 = Pause/suspend corresponding AQ application
at--04	Resume Application	BI	rc	1 = Resume corresponding AQ application
at--05	Application Run Status	By	rc	0 = Application thread not running 1 = Application stopped 2 = Application running 3 = Application suspended

3.1.10.2. Methods

Setting trigger = 1 signals the corresponding application defined in the AQ block.

3.1.11. Task Expert Data Entry Unicode String Fields (TX)

Access: "All Users"
Class Code: Data Type: D
Instances: 1

3.1.11.1. Attributes

tx0101-tx0150	Unicode String Fields 1-50	S40	rt	Task Expert Application uses these fields to retrieve operator-entered data.
tx0151	DataGrid Edited Field Data	S40	rt	DataGrid returns edited field data to Application
tx0152	DataGrid Edited Field Row ShortID$	S40	rt	DataGrid returns edited field row shortID$ to Application.
tx0153	DataGrid Edited Field Column Number	S40	rt	DataGrid returns edited field column number to application
tx0154	DataGrid Edited Field Row Index	S40	rt	DataGrid returns edited field row index to Application
tx0155	Task Expert Data Grid Response	S40	rt	The Task Expert application sets this field to "Accept" message to accept the edited data in the field. Otherwise, It sets the field to an Error message to reject the newly edited value.
tx0156	Current Focus Element	US	rt	Task Expert indicates the application object that currently has the focus. Task Expert writes this field whenever there is a change of focus for the application object.
tx0157	Lost Focus Element	US	rt	Task Expert indicates the application object that has just lost the focus. Task Expert writes this field whenever there is a change of focus for the application object.
tx0164	Datagrid Processing Error Status	US	rt	0 = OK 11 = Error Opening Database 12 = Error Writing to Database

3.1.11.2. Methods

Task Expert applications use these fields to retrieve data that the operator enters through the TEXTBOX, COMBOBOX, or DATAGRID objects displayed in the custom application window. The field

attribute number corresponds to the object number coded in the TEXTBOX or COMBOBOX commands.

4 Target Data

4.1. Complex Target Data

4.1.1. Full Target Statuses (ST)

Access:	"Read Only" Access		
Class Code:	0x93	Data Type:	D
Instances:	1		

4.1.1.1. Attributes

st0105	Below Low Tolerance Weight (Over/Under mode only)	BI	rt	0 = Over Low Tolerance Weight, 1 = Under Low Tolerance Weight
st0106	Above High Tolerance Weight (Over/Under mode only)	BI	rt	0 = Under High Tolerance Weight, 1 = Over High Tolerance Weight
st0107	In Tolerance	BI	rt	0 = Out of Tolerance, 1 = In Tolerance
st0109	Running (Basic Auto Filling only)	BI	rt	0 = not in running status, 1 = running status
st0110	Ready (Basic Auto Filling only)	BI	rt	0 = not in ready status, 1 = ready status
st0111	Pause (Basic Auto Filling only)	BI	rt	0 = not in pause status, 1 = pause status

4.1.1.2. Method

Please read the method description in data block "SP" for the Full Target Process status.

Applications can read the status of the Full Target operation from here.

4.1.2. Full Target Process Data (SP)

Access:	"Supervisor" Level Access.
	sp0104 and sp0106 are Service level.
Class Code:	0x69 Data Type: PP
Instances:	1

4.1.2.1. Attributes

sp0101	Description	S21	na	Descriptive identification for the active record "" [default]
sp0103	Source	S7	na	Parameter ID for source. Rounded Net Weight = wt0111 [default] Rounded Gross Weight = wt0110
sp0105	Target	D	rt	The desired measured value for a weighment 0 [default]
sp0111	Positive Tolerance (deviation)	D	rt	Highest acceptable tolerance above the target value. Any weight greater than **Target + (+Tolerance)** will be classified as Over 0 (default).
sp0112	Negative Tolerance (deviation)	D	rt	Lowest acceptable tolerance below a target value. Any weight lower than **Target – (-Tolerance)** will be classified as Under 0 [default]
sp0113	Tolerance Type	By	na	0 = Target Deviation [default] 1 = Exact Limits (not used for Basic Auto Filling) 2 = Percent of Target.
sp0114	Positive Tolerance Percent	D	na	Highest acceptable tolerance in percent of target above a target value. Any weight which is greater than **Target + (+Tolerance * Target/100)** will be classified as Over. sp0014 double 0 [default]

sp0115	Negative Tolerance Percent	D	na	Lowest acceptable tolerance in percent of target below a target value. Any weight below **Target – (-Tolerance * Target/100)** will be classified as Under.	
sp0120	Unit	By	na	0 = none 1 = pounds 2 = kilograms [default] 3 = grams	4 = metric tons 5 = tons 9 = ounces 10 = custom unit
sp0123	Totalization Type	By	na	0 = Disabled 1 = All 2 = In Tolerance	
sp0173	Target ID	US	na	Active Target ID in Target Table.	

4.1.2.2. Method

Fields in "sp" class are applicable with Basic terminal functionality. The Fill-570 uses different Shared Data.

4.2. Simple Target (Comparator) Data

4.2.1. Comparator Commands (SK)

Access:	"Supervisor" Level Access.
Class Code:	Data Type: D
Instances:	5

4.2.1.1. Attributes

sk--01	Reset Comparator	BI	rc	Set field to "1" to reset Comparator.
sk--03	Apply New Comparator Coincidence Value	BI	rc	Set field to "1" to apply new coincidence value written to sd--05.
sk--04	Reset Latch	BI	rc	Set field to "1" to reset latch.
sk--06	Pause Comparator	BI	rc	Set field to "1" to pause Comparator.
sk--07	Resume Comparator	BI	rc	Set field to "1" to resume Comparator.

4.2.2. Comparator Process Data (SD)

Access:	"Supervisor" Level Access. sp0104 and sp0106 are Service level.
Class Code:	None Data Type: PP
Instances:	5

4.2.2.1. Attributes

sd--01	Comparator Description	S21	na	Text name describing the comparator (simple setpoint)
sd--02	Comparator is Active	By	na	RST sets = 1 when the Target is active, = 0 when Target is disabled.

sd--03	Shared Data Field for Comparator Source	S7	na	Points to a Shared Data source field to be compared to coincidence target: Displayed Weight & ABS-Displayed Weight = wt0111 Gross Weight = wt0110 Rate & ABS-Displayed Weight = wt0114	
sd--04	Mode	By	na	0 = Unlatched 1 = Immediate 2 = Time Pulse 3 = Time Delay 4 = Weight	5 = Timed Pulse After Weight 6 = Time Delay After Weight 7 = Weight Range 8 = Weight Range OR
sd--05	Comparator Coincidence Value	D	na	Units must be the same as sd--03 Trigger change by setting corresponding sk--01instance to "1".	
sd--08	Comparator Operator	By	na	1 = ' < ', 2 = ' <= ', 3 = ' = ', 4 = ' <> ', 5 = ' > ', 6 = ' >= '	
sd--09	Second Weight Range Value	D	na	Used as a second target coincidence value in Weight Range mode; units must be the same as sd--03.	
sd--10	Second Weight Comparison Operator	By	na	1 = ' < ', 2 = ' <= ', 3 = ' = ', 4 = ' <> ', 5 = ' > ', 6 = ' >= '	
sd--30	Source for Comparator	By	na	0 = None 1 = Displayed Weight 2 = Gross Weight 3 = Rate 4 = Application 5 = ABS- Displayed Weight 6 = ABS - Rate	
sd--31	Unit	S7	na	Text string that is the units descriptor when the user selects "Application" as the source. This text string will display in setup when the comparator value is edited, or when limits are being set.	

4.2.2.2. Method

In its simplest form, a Comparator is a Target having two numeric data inputs and one binary output. One of the two numeric data inputs is a Coincidence (or Target) Value, which an Application may update at any time. The other numeric data input is an available shared data stream. You may associate the logical output of a Comparator Target with a physical Discrete Output or may use as an internal status.

Binary Result = Source value <comparison operator> Coincidence Target value

5 Discrete I/O Data

5.1.1. Local Discrete Input/Output Status (DI)

Access:	Discrete output statuses have a "Supervisor" Level Access. Discrete input statuses have "Read Only" Access.
Class Code:	0x78 Data Type: D
Instances:	1

5.1.1.1. Attributes:

di0101	Input Status 1	BI	rt	0 = Off, 1 = On.
di0102	Input Status 2	BI	rt	0 = Off, 1 = On.
di0103	Input Status 3	BI	rt	0 = Off, 1 = On.
di0109	Output Status 1(main board)	BI	rt	0 = Off, 1 = On.
di0110	Output Status 2(main board)	BI	rt	0 = Off, 1 = On.
di0111	Output Status 3(main board)	BI	rt	0 = Off, 1 = On.
di0201	Input Status 1(option board)	BI	rt	0 = Off, 1 = On.
di0202	Input Status 2(option board)	BI	rt	0 = Off, 1 = On.
di0203	Input Status 3(option board)	BI	rt	0 = Off, 1 = On.
di0204	Input Status 4(option board)	BI	rt	0 = Off, 1 = On.
di0205	Input Status 5(option board)	BI	rt	0 = Off, 1 = On.
di0209	Output Status 1(option board)	BI	rt	0 = Off, 1 = On.
di0210	Output Status 2(option board)	BI	rt	0 = Off, 1 = On.
di0211	Output Status 3(option board)	BI	rt	0 = Off, 1 = On.
di0212	Output Status 4(option board)	BI	rt	0 = Off, 1 = On.
di0213	Output Status 5(option board)	BI	rt	0 = Off, 1 = On.

di0214	Output Status 6(option board)	Bl	rt	0 = Off, 1 = On.
di0215	Output Status 7(option board)	Bl	rt	0 = Off, 1 = On.
di0216	Output Status 8(option board)	Bl	rt	0 = Off, 1 = On.

5.1.1.2. Method:

The IND500x has up to five Discrete Inputs and eight Discrete Outputs on its optional, internal Discrete I/O boards.

The Application can read or write the Discrete Output Statuses. It can only read the Discrete Input Statuses.

The Application or Ladder Logic can read or write these status bits to read or write the corresponding physical discrete inputs and outputs.

5.1.2. Discrete Input Edges (DE)

Access:	"Supervisor" default level, customizable by individual field.
Class Code:	Data Type: D
Instances:	1

5.1.2.1. Attributes:

de0101	Rising Input Edge 1(main board)	Bl	rc	1 = Transition from 0 to 1 detected
de0102	Rising Input Edge 2(main board)	Bl	rc	1 = Transition from 0 to 1 detected
de0103	Rising Input Edge 3(main board)	Bl	rc	1 = Transition from 0 to 1 detected
de0109	Falling Input Edge 1(main board)	Bl	rc	1 = Transition from 1 to 0 detected
de0110	Falling Input Edge 2(main board)	Bl	rc	1 = Transition from 1 to 0 detected
de0111	Falling Input Edge 3(main board)	Bl	rc	1 = Transition from 1 to 0 detected
de0201	Rising Input Edge 1(option board)	Bl	rc	1 = Transition from 0 to 1 detected
de0202	Rising Input Edge 2(option board)	Bl	rc	1 = Transition from 0 to 1 detected
de0203	Rising Input Edge 3(option board)	Bl	rc	1 = Transition from 0 to 1 detected
de0204	Rising Input Edge 4(option board)	Bl	rc	1 = Transition from 0 to 1 detected
de0205	Rising Input Edge 5(option board)	Bl	rc	1 = Transition from 0 to 1 detected

de0209	Falling Input Edge 1(option board)	Bl	rc	1 = Transition from 1 to 0 detected
de0210	Falling Input Edge 2(option board)	Bl	rc	1 = Transition from 1 to 0 detected
de0211	Falling Input Edge 3(option board)	Bl	rc	1 = Transition from 1 to 0 detected
de0212	Falling Input Edge 4(option board)	Bl	rc	1 = Transition from 1 to 0 detected
de0213	Falling Input Edge 5(option board)	Bl	rc	1 = Transition from 1 to 0 detected

5.1.2.2. Method:

The Resident Scale Task sets the associated command to 1 when it detects a rising or falling edge on a discrete input. The Application can trigger this change of state. After receiving the trigger, the Application must reset the command to 0 in order to be able to receive the next trigger.

When edge-triggered inputs are used in a ladder, they can be automatically cleared. Refer to details in the LL block description, in section 5.1.5, below.

5.1.3. Remote Discrete Input Edges (RE)

Access:	"Supervisor" default level, customizable by individual field.		
Class Code:	0x77	Data Type:	D
Instances:	3	There are up to 3 Remote I/O "nodes."	

5.1.3.1. Attributes:

re--01 re--04	Rising Input Edge 1 - 4	Bl	rc	1 = Transition from 0 to 1 detected
re--05 re--08	Falling Input Edge 1 - 4	Bl	rc	1 = Transition from 0 to 1 detected

5.1.3.2. Method:

The Resident Scale Task sets the associated command to 1 when it detects a rising or falling edge on a discrete input. The Application can trigger this change of state. After receiving the trigger, the Application must reset the command to 0 in order to be able to receive the next trigger.

When edge-triggered inputs are used in a ladder, they can be automatically cleared. Refer to details in the LL block description, in section 5.1.5, below.

5.1.4. Remote Discrete Input/Output Status (RI)

Access:	Discrete outputs have a "Supervisor" Level Access. Discrete inputs have "Read Only" Access.		
Class Code:	0x95	Data Type:	D
Instances:	3	There are up to 3 Remote I/O "nodes."	

5.1.4.1. Attributes:

ri--01 to ri--04	Input Status 1-4	BI	rt	0 = Off, 1 = On.
ri--05 to ri--10	Output Status 1 - 6	BI	rt	0 = Off, 1 = On.
ri--21	Remote Unit Status	By	rt	0 = Not active, 1 = Status OK, 2 = Error condition

5.1.4.2. Method:

The ARM100 Remote Discrete I/O Unit attaches to the IND500x through a Serial port. There can be up to 3 ARM100 nodes. Each node has 4 Discrete Inputs and 6 Discrete Outputs. The IND500x monitors the state of the Remote Discrete I/O using a unique Serial I/O protocol that talks to the Remote I/O unit.

The Resident Scale Task records the state of the physical discrete inputs and outputs in Shared Data. The Application can read the individual statuses. The Application can read or write the Discrete Output Statuses. It can only read the Discrete Input Statuses.

5.1.5. Internal Ladder Logic Program Setup (LL)

Access:	"Maintenance" Level Access
Class Code:	Data Type: PS
Instances:	1

5.1.5.1. Attributes:

II0101	Number of Ladder Rungs	By	na	Number of rungs in the ladder program
II0102 to II0199	Ladder Logic Rungs 1-98	S32	na	Each attribute is a Ladder Logic Rung

5.1.5.2. Method

The IND500x has a simple Ladder Logic Interpreter that runs in the background monitor continuously Discrete I/O and Shared Data commands. The Ladder Logic Program executes these tasks efficiently to minimize CPU utilization and to respond quickly to "real-time" changes in Discrete I/O or Shared Data commands.

The Ladder Logic Interpreter runs in conjunction with Visual Basic or Task Expert Programs. Visual Basic and Task Expert are the custom application programming languages for the IND500x. They handle sophisticated application tasks and operator interfaces. The Ladder Logic Interpreter efficiently handles the very simple, repetitive task of monitoring Discrete IO and Shared Data commands. Using the Interpreter, you eliminate the significant processing overhead and logic in custom Visual Basic applications required to accomplish these repetitive tasks. Visual Basic applications and the Ladder Logic programs communicate to each other through Shared Data.

The Control Panel Setup and other Application programs must build the Ladder Logic program for their application. The Ladder Logic commands provide flexibility for different applications to select

what signals the Interpreter monitors and how it acts on the signals. The Ladder Logic Interpreter loads the program code from this Shared Data block. Each attribute is a Ladder Logic Rung.

5.1.5.2.1. Ladder Rung Commands

There are six rung commands. Each rung takes one or two inputs, and has one output. The rung inputs and outputs are physical Discrete IO or Shared Data commands.

RUNGAND input1, input2, output takes two inputs, "AND's" them together, and outputs the result. For example, take a physical discrete input "permissive" signal and "AND" it with "Target 1 feeding" to generate a physical discrete output.

RUNGAND ri0101,st0103,di0105

RUNGANDNT input1, input2, output takes two inputs, "AND's" them together, and outputs the inverse value. For example, take two physical inputs and generate a physical discrete output.

RUNGANDNT di0101,di0102,di0105

RUNGMOV input, output takes an input and generates an output with the same value. For example, take a tare when a physical discrete input goes on.

RUNGMOV di0103,wc0201

RUNGMVNOT input, output moves the inverse of the input to the output. For example, turn on a physical discrete output when the data from the scale is invalid.

RUNGMVNOT wx0138,di0108

RUNGOR input1, input2, output takes two inputs, OR's them together, and outputs the result. For example, turn on a physical discrete output if the scale is in motion.

RUNGOR wx0131,wx0231,di0508

RUNGORNOT input1, input2, output takes two inputs, OR's them together, and outputs the inverse value. For example, turn on a physical discrete output when either the custom application turns off an application status or a physical discrete input is off.

RUNGORNOT as0101,di0103,di0505

The IND500x defines commands as one byte hex value as referenced in the table below:

Command	Hex Value
RUNGAND	0x61
RUNGANDNT	0x67
RUNGMOV	0x65
RUNGMVNOT	0x75
RUNGOR	0x62
RUNGORNOT	0x72

6 Database and Table Data

6.1.1. Database Table Description (DD)

Access:	"All Users" Access		
Class Code:		Data Type:	PP
Instances:	10	One entry for each of the A0 – A9 Standard tables. 2 = Table A1 = Tare Table 3 = Table A2 = Target Table	

6.1.1.1.1. Active Record

dd--01	Entry number of current record	S8	na	Column 1 - Entry number of the current database record
dd--02	Alphanumeric Key	S16	na	Column 2 - Alphanumeric Key
dd--03	Description field of current record	S40	na	Column 3 - Description field of the current record
dd--04	Data 1 field of current record	S16	na	Column 4
dd--05	Data 2 field of current record	S16	na	Column 5
dd--06	Data 3 field of current record	S16	na	Column 6
dd--07	Data 4 field of current record	S16	na	Column 7
dd--08	Data 5 field of current record	S16	na	Column 8
dd--09	Data 6 field of current record	S16	na	Column 9
dd--10	Data 7 field of current record	S16	na	Column 10
dd--11	Data 8 field of current record	S16	na	Column 11
dd--12	Data 9 field of current record	S40	na	Column 12
dd--13	Data 10 field of current record	S40	na	Column 13
dd--14	Data 11 field of current record	S40	na	Column 14
dd--15	Data 12 field of current record	S40	na	Column 15

6.1.1.1.2. Database Usage

dd--34	# of Columns in Database Table	By	na	Number of Columns used in table

6.1.1.1.3. Report Format

dd--41	Table Descriptive Name	S40	na	Descriptive Name for the table, such as TARE, TARGET, PERM_TR or TEMP_TR

6.1.1.1.4. Statistics

dd--51	Number of Entries in Table	US	na	

6.1.1.1.5. Column Names

dd--61	Name for Column 1	S16	na	Corresponds to dd--01 entry
dd--62	Name for Column 2	S16	na	Corresponds to dd--02 entry
dd--63	Name for Column 3	S16	na	Corresponds to dd--03 entry
dd--64	Name for Column 4	S16	na	Corresponds to dd--04 entry
dd--65	Name for Column 5	S16	na	Corresponds to dd--05 entry
dd--66	Name for Column 6	S16	na	Corresponds to dd--06 entry
dd--67	Name for Column 7	S16	na	Corresponds to dd--07 entry
dd--68	Name for Column 8	S16	na	Corresponds to dd--08 entry
dd--69	Name for Column 9	S16	na	Corresponds to dd--09 entry
dd--72	Name for Column 12	S16	na	Corresponds to dd--12 entry
dd--75	Name for Column 15	S16	na	Corresponds to dd--15 entry
dd--77	Data Type for Column 4	S16	na	dd--04 entry type % = Integer # = Float $ = Character (default)
dd--78	Data Type for Column 5	S16	na	dd--05 entry type
dd--79	Data Type for Column 6	S16	na	dd--06 entry type
dd--80	Data Type for Column 7	S16	na	dd--07 entry type
dd--81	Data Type for Column 8	S16	na	dd--08 entry type
dd--82	Data Type for Column 9	S16	na	dd--09 entry type

6.1.1.2. Method

An Application can use the Miscellaneous fields in this block to maintain Database Table records. The Application can set these fields in a print template for printing by the RST.

The tables reside in the "flash2" disk.

6.1.1.2.1. A1 - Tare Table

SD Field	DB Field	Name	Type	Len	Description
dd0201	Record number				
dd0202	Alphanumeric Key	ID	A/N	16	Tare ID
dd0203	Description	Description	A/N	40	Tare Description
dd0204	Data1	Tare	N		Tare Value
dd0205	Data2	Unit	N		Weighing Unit (see td0125 for unit designations)
dd0206	Data3	n	N		Total Count
dd0206	Data4	Total	N		Total Weight

6.1.1.2.2. A2 - Target Table

SD Field	DB Field	Name	Type	Len	Description
dd0301	Record number				
dd0302	Alphanumeric Key	ID	A/N	16	Target ID

dd0303	Description	Description	A/N	40	Target Description
dd0304	Data1	target	N		Target value
dd0305	Data2	Units	A/N		Target Units (see td0125 for unit designations)
dd0306	Data3	spill	N		Spill value
dd0307	Data4	aTol	N		Positive Tolerance
dd03008	Data5	sTol	N		Negative Tolerance
dd0309	Data6	fine	N		Fine Feed

6.1.2. Database (Table) Setup (DS)

Access:	"Maintenance" Level Access
Class Code:	Data Type: PS
Instances:	1

6.1.2.1.1. Target Table Settings

ds0111	Work Mode	By	na	0 = None 1 = Basic Auto-Filling 3 = Over/Under	5 = Manual Filing 6 = Advanced Auto-Filling 7 = Drum Filling
ds0112	Target Output Mode	By	na	0 = Concurrent Target Outputs (feed and fast feed are on together) 1 = Independent Target Outputs (feed and fast feed are on separately)	
ds0114	Target Description In Report	Bl	na	0 = Disabled. 1 = Enabled	
ds0115	Target Value In Report	Bl	na	0 = Disabled. 1 = Enabled	
ds0116	Target Tolerances In Report	Bl	na	0 = Disabled. 1 = Enabled	
ds0117	Target Spill Value In Report	Bl	na	0 = Disabled. 1 = Enabled	
ds0118	Target Fine Feed Value In Report	Bl	na	0 = Disabled. 1 = Enabled	
ds0119	Target Totalization Weight	By	na	0 = None, 1 = Gross Weight, 2 = Net (Displayed) Weight	

6.1.2.1.2. Tare Totalization Table Settings

ds0121	Tare Totalization Weight	By	na	0 = None 1 = Gross Weight 2 = Net (Displayed) Weight
ds0122	Tare Description Enabled	Bl	na	0 = Disabled. 1 = Enabled.
ds0124	Tare Value In Report	Bl	na	0 = Disabled. 1 = Enabled.
ds0125	Tare Description In Report	Bl	na	0 = Disabled. 1 = Enabled.
ds0126	Tare "n" Value In Report	Bl	na	0 = Disabled. 1 = Enabled.
ds0127	Tare Totalization In Report	Bl	na	0 = Disabled. 1 = Enabled.

6.1.2.2. Method

The Control Panel uses the Target Settings for building a table of Targets.

The Control Panel uses the Global Tare Totalization Settings for building a Tare Settings Table. The Formatted Output Server (FOS) in the Resident Scale Task adds the weight for each completed transaction to the Tare Totalization totals.

6.1.3. Temporary Database Table Description (TD)

Access:	"All Users" Access		
Class Code:		Data Type:	PP
Instances:	1	One entry for each scale.	

Active Target Table Record

td0122	Active Target Table ID	S16	na	ID of active Target Table record	
td0123	Description	S40	na	Description field of active Target Table record	
td0124	Target	S16	na	Target value of active Target Table record	
td0125	Units	S16	na	1 = lb 2 = kg 3 = g 5 = t	7 = ozt 8= dwt 9 = oz 11 = ton
td0127	Lower Tolerance	S16	na	Lower tolerance value of active Target Table record	
td0128	Upper Tolerance	S16	na	Upper tolerance value of active Target Table record	

6.1.3.1. Method:

These shared data fields will report values only if the active Tare or Target record was retrieved directly from the Tare or Target Table. If manual changes are made to the active Tare or Target record, these shared data values will report empty fields.

The shared data fields for Active Tare and Active Target are only applicable for standard functionality Over/Under or Material Transfer modes of operation. They do not work for the Fill-570 Application Software.

7 Communication and PLC Data

7.1. Web and Network Data

7.1.1. Web Page Process Data (HT)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PP
Instances:	1		

7.1.1.1. Attributes

ht0130	Shared Data Server Save Area	AL110	na	Saves Shared Data Socket Server callbacks and group settings

7.1.2. Web Page Indirect Read Pointer (WB)

Access:	"Maintenance" Access, customizable by individual field		
Class Code:	None	Data Type:	
Instances:	1		

7.1.2.1. Attributes

wb0101	Indirect read pointer 1	S6	na	
wb0102	Indirect read pointer 2	S6	na	
wb0103	Indirect read pointer 3	S6	na	
wb0104	Indirect read pointer 4	S6	na	
wb0105	Indirect read pointer 5	S6	na	
wb0106	Indirect read pointer 6	S6	na	
wb0107	Indirect read pointer 7	S6	na	
wb0108	Indirect read pointer 8	S6	na	
wb0109	Indirect read pointer 9	S6	na	
wb0110	Indirect read pointer 10	S6	na	

7.1.3. Data Connections Setup (DC)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	20		

7.1.3.1. Attributes

dc--01	Output Connection Type	By	na	0 = none 1 = ASCII input 2 = Continuous Output 3 = Continuous Extend 4 = Continuous Template 5 = Reserved 6 = CTPZ 7 = Demand Output 8 = Reports	9 = Remote I/O (via local serial port) 10 = reserved 11 = shared data server 12 = SICS server 13 = Total Reports 14 = Remote I/O (via ACM500) 15 = Print Proxy
dc—04	Output Trigger	By	na	Entity that triggers output: 0 = None 1 = Scale 6 = Trigger 1 7 = Trigger 2	8 = Trigger 3 9 = Blend/Fill 10 =- Cycle 11 = Dose 12 = Dump
dc—05	Print Template(s)	ABy 11	na	An array which indicates what print template is being used on the connection. Only Entry 1 is used: 1 = Template 1 … 10 = Template 10 Example: 4 0 0 0 0 0 0 0 0 0 = Connection uses Template 4	
dc—07	I/O Port	ABy 3	na	Only the first entry is used. Entries 2 and 3 are reserved. 1 - 6 = Serial Ports 1 to 6 8 – 11 = Eprint 1 to 4 12 = Print Client	
dc—08	Add Checksum	Bl	na	1 = Add checksum to end of output string	

7.1.3.2. Method

You can establish Data Connections to Serial Ports and TCP/IP (Ethernet) Connection Ports. There is a separate instance of the DC class for each data connection. You may only specify a single output type OR a single input type in each connection instance – not both. An SICS command connection is an exception; it is both and input and an output connection.

Here are some rules for configuring data connections:

- Demand Print and Continuous Print connections CANNOT share the same I/O port.
- An input connection CANNOT share the same I/O port with another input connection.

- Multiple demand print and custom print connections CAN share the same I/O port.
- Demand OR Continuous Print connections CAN share an I/O port with a single Input-only connection, such as CTPZ-command connection or a bar-code reader connection.
- A SICS-connection must have exclusive use of its I/O port since it does bi-directional I/O.
- Scales and Remote Discrete I/O devices must have exclusive use of their I/O port.
- Custom applications must have exclusive use of their I/O ports for communicating bi-directionally with a custom device. However, they CAN share a port with demand print and custom print connections when the Application is doing output-only operations.
- Only the first LPRINT connection definition is valid.
- Only the first Continuous Standard connection for each scale is valid.
- Only the first Continuous Template connection for each scale is valid. The maximum length of Template Continuous Output string is 200 characters.
- Only the first Continuous Multiplexed connection is valid.

The RST uses the "Output Trigger" parameter for determining which device or command can trigger the print operations for the connection. Shared Data commands for each device initiate the demand or continuous print operations. Shared Data commands trigger the custom print operations.

The TCP/IP Console Print Server enables one or more remote client programs to receive print data from the IND500X. The remote clients can be WINDOWS PC Visual Basic applications or other TCP/IP host programs. You must first enable the TCP/IP Console Print Server Print Connection. Then, whenever a remote client establishes a TCP/IP connection, the Console Print Server sends the LPRINT data, the Demand and Custom print data, and the Console Log data to the client across the TCP/IP connection to the remote client. The Console Print Server uses TCP/IP port 1701 for establishing connections.

The IND500X Console Print Server sends only the specific output selected by the Output Connection and LPRINT device parameters in the TCP/IP data connection instances.

In order to route print connection data to a remote IND500X terminal I/O port, you must setup an output connection to a TCP/IP port locally. In the remote IND500X terminal, you must configure a "Network Print Client" to fetch the data and route it to the proper I/O port.

The TCP/IP Console Print Server routes input data that it receives as keystrokes to the Softkey Manager/ Keyboard Routing. Then, using this connection, a remote client can submit keystrokes to the IND500X.

Each Demand print, Custom print, or LPRINT message have a <dprint> and </dprint> delimiter tags to denote the beginning and end of the message, and they may span multiple messages. The Print Client and destination Serial Services task must print the data within the beginning and ending tags sequentially and consecutively so that messages from different terminals do not become intermixed.

7.1.4. FTP Server Setup (NF)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

7.1.4.1. Attributes

nf0101	Enable FTP Server	BI	na	0 = FTP disabled completely 1 = FTP enabled. Read all data and write data based on the user's level of FTP access rights (default) 2 = FTP enabled. Read all data but no write access - regardless of the user's level of FTP access rights.

7.1.4.2. Method

The FTP Server listens on a TCP/IP port for a remote FTP client to initiate a connection with the FTP Server. Once the Client and Server establish the connection, the FTP client initiates the file transfers to and from the Server, using standard FTP Protocol commands.

7.1.5. Network Print Client Setup (NP)

Access:	"Maintenance" Level Access is default. Customizable by individual field.		
Class Code:	np	Data Type:	PS
Instances:	1		

7.1.5.1. Attributes

np0101	Enable Network Print Client	BI	na	0 = No. 1 = Yes
np0105	Network Print Client Port Number	S21	na	
np0106	Network Print Client IP Address	S40	na	
np0109	Reserved	BI	na	

7.1.6. TCP/IP/Ethernet Network Setup (NT)

Access:	"Maintenance" Level Access. nt0101 is read only, nt0113 and nt0114 are "admin" level		
Class Code:		Data Type:	PS
Instances:	1		

7.1.6.1. Attributes

nt0101	Ethernet MAC Address	S13	na	Read from Ethernet Adapter.

nt0102	Ethernet IP Address	S40	na	Default: 192.168.0.1 Used only when IP address is fixed – when DHCP is not being used.
nt0103	Ethernet IP Address Subnet Mask	S40	na	Default: 255.255.255.000
nt0104	Ethernet Gateway IP Address	S40	na	Default: 000.000.000.000
nt0105	Enable Ethernet DHCP Client	By	na	0 = No. 1 = Yes
nt0107	Ethernet Name	S40	na	Default is IND500X
nt0113	Shared Data Server Access	By	na	0 = Disable, 1 = Read/Write (default), 2 = Read Only
nt0114	Web Server Access	By	na	0 = Disable, 1 = Read/Write (default), 2 = Read Only
nt0115	Automatic DNS Server Addressing	By	na	0 = Disable, 1 = Enable
nt0116	Preferred DNS Server	S40	na	IP Address
nt0117	Alternate DNS Server	S40	na	IP Address
nt0118	Enable Proxy Server	By	na	0 = Disable, 1 = HTTP, 2 = Socks v5
nt0119	Proxy Server Address	S40	na	Domain name or IP address
nt0120	Proxy Port	US	na	Default: 8080
nt0121	Proxy User Name	S13	na	Proxy server user name
nt0122	Proxy Password	S13	na	Proxy server passport

7.1.7. Serial Port Setup (RP)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	6		

7.1.7.1. Attributes

rp--01	Interface Type	By	na	0 = RS232. 1 = RS422 . 2 = RS485		
rp--02	Baud Rate	By	na	0 = 300	4 = 4800	8 = 57,600
				1 = 300	5 = 9600	9 = 115,200
				2 = 1200	6 = 19,200	
				3 = 2400	7 = 38,400	
rp--03	Parity	By	na	0 = None. 1 = Odd. 2 = Even.		
rp--04	Flow Control	By	na	0 = None. 1 = Xon/Xoff.		
rp--05	Data Bits	By	na	1 = 7 bits, 2 = 8 bits		
rp--06	Stop Bits	By	na	1 or 2		

rp--08	Assignment for Port	By	rt	0 = None 2 = Remote Discrete I/O (ARM100) 3 = Data Connection 4 = Application
rp--09	Assigned Use of COM4 and COM5	By	na	Used for the IND500Xx COM4 and COM5 port setup. 0 = None 3 = Standard 5 = ACM500

7.2. Print and Templates Data

7.2.1. Demand Print Setup (DP)

Access:	"Maintenance" Level Access dp0102 is Administrator Level Access
Class Code:	Data Type: PS
Instances:	1

7.2.1.1. Attributes

dp0101	Enable Auto-Print	BI	na	0 = Disabled. 1=Enabled.
dp0102	Ensure No Motion Before Printing	BI	na	0 = No. 1 = Yes.
dp0103	Print Threshold	D	na	Weight threshold for Auto-Print and Scale Weighment Monitoring. Set in primary weight units.
dp0104	Print Reset Threshold	D	na	Weight threshold for resetting Auto-Print and Scale Weighment Monitoring. Set in primary weight units.
dp0105	Minimum Weight Print Threshold	D	na	Minimum print threshold for demand print.
dp0107	Print Interlock Enabled	BI	na	1 = Enabled; 0 = Disabled
dp0108	Weight Deviation Print Threshold	D	na	Auto-Print when this absolute weight deviation occurs from the last printed weight.

7.2.1.2. Method

The Demand Print command is a "transaction" print command. A local operator, an external operator, or a remote device can generate a print command. When the Resident Scale Task receives a Print command, it formats and stores weight and other data as a transaction record for the scale. It forwards the transaction record to one or more destinations, which could include a printer, Alibi (transaction) memory, or a remote device.

The Resident Scale Task rejects Print command when:

- The scale weight is less than the Minimum Print Weight.
- The scale is in motion and dp0102 is enabled.

- After generating a print, the Resident Scale Task has not reset the print trigger because the weight has not gone below the print reset threshold, when auto-print is enabled in dp0101.

Auto-Print is Demand Print command that operates in conjunction with the Print Threshold and the Reset Print Threshold. When the scale weight goes above the Print Threshold and there is no motion the scale, the Resident Scale Task automatically generates a demand print. When the scale goes below the Print Reset Threshold, the Resident Scale Task re-enables or re-sets for the next print.

Print Connections Table associates a logical print command with one or more physical print devices and print messages. The Print Template Setup specifies the format of the print messages.

Scale Monitoring uses these settings to count the number and size of the scale's weighments.

The Weights and Measures seal protects the print configuration.

7.2.2. Custom Print Trigger Commands & Statuses (CP)

Access:	"All Users" Access		
Class Code:	0x94	Data Type:	D
Instances:	1		

7.2.2.1. Attributes

cp0101	Custom Print Trigger 1-3	Bl	rc	Set from 0 to 1to start custom print.
cp0102				
cp0103				
cp0104	Fill PAC Print Trigger	Bl	rc	Blend/Fill
cp0105	Fill PAC Print Trigger	Bl	rc	Cycle
cp0106	Fill PAC Print Trigger	Bl	rc	Dose
cp0107	Fill PAC Print Trigger	Bl	rc	Dump
cp0111	Custom Print Trigger 1–3 status	By	rt	Command Completion Statuses 0 = Success. 1-255 = Specific error code.
cp0112				
cp0113				
cp0114	Fill PAC trigger status	Bl	rt	Blend/Fill
cp0115	Fill PAC trigger status	Bl	rt	Cycle
cp0116	Fill PAC trigger status	Bl	rt	Dose
cp0117	Fill PAC trigger status	Bl	rt	Dump

7.2.2.2. Method

The Application uses this Shared Data block to activate custom triggers and to monitor their completion status.

7.2.3. Print Templates Setup (PT)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

7.2.3.1. Attributes

pt0101 to pt0110	Print Templates 1–10	S1001	na	Printer Template – Refer to Appendix B in IND500X Technical Manual for Default Template formats.
pt0111 to pt0130	Print Literals 1-20	S51	na	Fixed Text Messages used in Templates

7.2.3.2. Method

Templates are a method to configure both data content and data format in print messages. A Template is a user specific "program" that the RST Template Interpreter executes to build a print message. A Template defines a serial data stream that the IND500X transmits to a printer, sends to a host computer, or writes to a data file. The IND500X supports template nesting. Templates make use of the encapsulation of related data fields. For example, weight data is not composed of 10 isolated fields, but is instead a single object having many highly correlated attributes, such as gross, tare, net, units, and tare mode. These attributes remain internally consistent at all times.

The Weights and Measures seal does not protect Template editing.

A Template Editor that runs in the IND500X Control Panel or in a remote PC Setup program enables the user to build the Template.

Appendix B in the IND500X Technical Manual describes the Default Template formats.

7.2.4. Report Print Templates Setup (RT)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

7.2.4.1. Attributes

rt0101	Report Width	Bl	na	0 = Wide (80characters) 1 = Narrow (40 characters)
rt0102	Blank Header Lines	By	na	# of blank lines in header.
rt0103	Print Standard Title	Bl	na	0 = No 1 = Yes
rt0104	Record Separation	By	na	0 = None, 1 = *, 2 = -, 3 = =, 4 = CR/LF
rt0105	Blank Footer Lines	By	na	# of blank lines in footer.

7.2.4.2. Method

RST uses the Report Template settings for printing the Standard Terminal reports.

7.2.5. Command Input Setup (MS)

Access:	"Maintenance" Level Access.
Class Code:	Data Type: PS
Instances:	8 (Only 1 instance for ms0103 - ms0106.) Specific to COM-570 customizable Command Template feature

7.2.5.1. Attributes

ms--01	Function Type	By	na	0 = None, 1 = Clear, 2 = Preset Tare, 3 = Print, 4 = Switch Units, 5 = Switch Unit 1, 6 = Switch Unit 2, 7 = Tare, 8 = Zero
ms--02	Character	ABy7	na	Up to 7 characters (numbers, letters and any special characters) can be entered for any command (Clear, Tare, Print, Zero, Switch Units, Primary Unit, Second Unit, Preset Tare). Preset Tare: can be added after the Preset Tare to creat a custom format.
ms0103	Prefix1	By	na	
ms0104	Prefix2	By	na	
ms0105	Terminator1	By	na	
ms0106	Terminator2	By	na	
ms--07	Character	ABy7	na	Up to 7 characters (numbers, letters and any special characters) can be entered for Preset Tare command. Can be added before Preset Tare to create a custom format.

7.3. Prompt (ID Mode) Data

7.3.1. ID1-4 Setup (PR)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	4		

7.3.1.1. Attributes

pr--01 – pr--30	Setup of individual ID steps	Aby6	na	ID step setup array: First byte is setup number, value is 1-30. Second byte is type, value is 0-6: 0 = Alphanumeric 1 = Clear Tare 2 = Numeric 3 = Print 4 = Tare – Auto 5 = Tare – Preset 6 = Selection List (only available for pr01--) Third byte is Clear Data, value is: 0 = Disabled 1 = Enabled Fourth byte is length, or number of selections in list, when bit 2 = 6 Fifth and sixth bytes are Reserved.
pr--31 … pr--60	Prompt string 1 – 30	S30	na	One value for each of 30 steps.
pr--81	Prompt Mode	By	na	0 = None, 1 = Automatic (only available for pr01--), 2 = Softkey
pr--82	Prompt Looping	By	na	0 = Disabled, 1 = Enabled
pr--83	Prompt Threshold	D	na	Entered value
pr--84	Prompt Reset Threshold	D	na	Entered value

7.3.2. ID Selection List (SL)

Access:	"Maintenance" default level is customizable by individual field		
Class Code:	sl	Data Type:	
Instances:	4		

7.3.2.1. Attributes

sl--01	Prompt string 1-6			
sl--02				
sl--03				

sl--04				
sl--05				
sl--06				

When the second byte of pr--01 (ID step setup array) is set to 6 (Selection List), the sl block defines the content of a list of up to 6 items.

7.3.3. Prompt Response (PA)

Access:	"All Users" Level Access, customizable by individual field.
Class Code:	Data Type: PP
Instances:	4

7.3.3.1. Attributes

pa--01 - pa--30	Prompt string 1-30	S51	na	Corresponding entries to Prompts as defined in the "pr" block.
pa--81	Prompt Selected Index	By	na	Selection list item's index. Content saved in PA block.

When Selection Box is used, the selection will be shown as a text string.

7.4. Analog Output Data

7.4.1. Analog Output Setup (AO)

Access:	"Maintenance" Level Access, customizable dy individual field.
Class Code:	Data Type: PS
Instances:	1

7.4.1.1. Attributes

ao0101	Data Source	By	na	1 = Gross Weight 2 = Net Weight 3 = Rate 4 = Application 5 = ABS – Displayed Weight 6 = ABS - Rate
ao0102	Source Device	By	na	Always 1 (Scale)
ao0103	Zero Preset	D	na	Value = Zero on Analog Output
ao0104	Span Preset	D	na	Value = Span on Analog Output
ao0105	Zero Adjustment	D	na	Manual Adjustment to Zero
ao0106	Span Adjustment	D	na	Manual Adjustment to Span
ao0107	Output range/type selection	By	na	0 = 4-20 mA 1 = 0-10V

7.4.1.2. Method

The Analog Output logic always reports weight in primary units.

7.5. PLC Data

7.5.1. PLC Setup (PL)

Access:	"Maintenance" Level Access, customizable by individual field.
Class Code:	Data Type: PS
Instances:	1

7.5.1.1. Attributes

plI0101	PLC Node Address	By	na	PROFIBUS station ID 1-127 Ethernet/IP MacID 1-99	
plI0102	PLC Type	By	na	0 = None 1 = Reserved 2 = PROFIBUS 3 = Ethernet/IP	4 = Reserved 5 = Reserved 6 = Analog Out 7 = PROFINET
				The RST automatically determines the PLC Type by reading the installed hardware board	
plI0103	Number of Message Slots Used	By	na	Slots used in PLC Message – up to 4	
plI0106	Data Format	By	na	1 = Integer Weight 2 = Integer Increments 4 = Floating Point 5 = Assembly Template (in s/w Phase II)	6 = Application Processing In s/w Phase II) 7 = SAI
plI0107	Enable Explicit Messaging	BI	na	0 = Disabled. 1 = Enabled. For PROFIBUS, this field enables reading and writing of Shared Data IO blocks appended to cyclic data messages. Ethernet/IP contains explicit messaging as a part of its standard protocol.	
plI0109	DHCP Client Enable	BI	na	Default = 1, enable	
plI0113	Byte-Ordering of PLC Data	By	na	For Legacy: 0 = Little Endian 1 = Big Endian 2 = Jag/AB-RIO Endian Please refer to the Method description, below, for the definition of the byte ordering.	For SAI: 0 = Automatic 1 = Little Endian 2 = Byte Swap Only 3 = Word Swap Only 4 = Big Endian
plI0115	Size of Application Cyclic Input to PLC	US	na	In "Application Processing" Data Format mode (Task Expert), the Application must set the exact size of the input assemblies.	

pl0116	Size of Application Cyclic Input from PLC	US	na	In "Application Processing" Data Format mode (Task Expert), the Application must set the exact size of the output assemblies.
pl0120	Rotation	S10	na	Restore user configuration about slot 1 rotation.
pl0121	Rotation	S10	na	Restore user configuration about slot 2 rotation.
pl0122	Rotation	S10	na	Restore user configuration about slot 3 rotation.
pl0123	Rotation	S10	na	Restore user configuration about slot 4 rotation.
pl0125	Ethernet PLC IP Address	S40	Na	IP Address for Ethernet/IP
pl0126	Ethernet PLC Subnet Mask	S40	Na	Subnet Mask for Ethernet/IP
pl0127	Ethernet PLC Global Address	S40	Na	Subnet Mask for Global Address
pl0134	Operating mode	By	na	Data format mode 0 = Compatible with IND780 and IND131/331 (default) 1 = Emulation mode – match existing IND560 mode
pl0135	PROFINET IP assignment	US	na	0 = DHCP disabled, 1 = DHCP enabled

7.5.1.2. Method

The IND500X RST supports the following general methods for building PLC output messages and processing PLC Input Messages:

1. The RST uses Internally-Defined PLC input and output messages. These messages have a fixed format. The RST builds the output messages and processes the input messages based on this fixed format.
2. The Application processes the PLC messages. The RST sends the Output-to-PLC messages from the Dynamic PLC IO Shared Data Block (PD). It writes the Input-from-PLC messages to the same block and alerts the Application that there is a new message.

7.5.1.2.1. PLC Data Byte-Ordering – pl0113

		Word Swap			Byte Swap			Historic			Double Word Swap		
	Terminal Weight Value	1355			1355			1355			1355		
	PLC	15	Bits	0	15	Bits	0	15	Bits	0	15	Bits	0
Integer	Weight value word	0x054B Hex			0x4B05 Hex			0x054B Hex			0x4B05 Hex		
Floating Point	1st Weight value word	0x6000 Hex			0xA944 Hex			0x44A9 Hex			0x0060 Hex		
	2nd Weight value word	0x44A9 Hex			0x0060 Hex			0x6000 Hex			0xA944 Hex		

Rotation is only supported in Floating Point mode. The following AB RIO and PROFIBUS commands create the correct strings of "Y"s and "N"s to set up the desired rotations.

- Command 03 (PLC RESET ROTATION) will fill PLC rotation SDV (Either pl0120 or pl 0121 for AB RIO. pl0121, pl0122, pl0123 or pl0124 for PROFIBUS) with "NNNNNNNNN"
- Command 40 will fill 'Y' to the first byte
- Command 41 will fill 'Y' to the second byte
- Command 42 will fill 'Y' to the third byte
- Command 43 will fill 'Y' to the 4th byte
- Command 44 will fill 'Y' to the 5th byte
- Command 45 will fill 'Y' to the 6th byte
- Command 46 will fill 'Y' to the 7th byte
- Command 47 will fill 'Y' to the 8th byte
- Command 48 will fill 'Y' to the 9th byte

7.5.2. Dynamic PLC IO Data (PD)

Access:	"All Users"		
Class Code:	None	Data Type:	D
Instances:	1		

7.5.2.1. Attributes

pd0101	Application Cyclic Input to PLC Buffer	ABy500	rt	Task Expert Application sets Cyclic Input to PLC buffer.
pd0102	Application Cyclic Input to PLC Length	US	rt	Task Expert Application sets input buffer length. RST transfers data length from setting in pl0115.
pd0103	Application Cyclic Output from PLC Buffer	ABy500	rt	RST sets Cyclic Output data from PLC in buffer for Task Expert application.
pd0104	Application Cyclic Output from PLC Length	US	rt	RST sets data length for pl0116.
pd0105	Application Explicit Out from PLC Buffer	ABy500	rt	RST sets Explicit Output sent from PLC in in this buffer for Task Expert application. This capability is available for explicit messaging and for ABRIO Block Transfer messaging only.
pd0106	Application Explicit Out from PLC Length	US	rt	RST sets length of Explicit Output data length for Task Expert Application.
pd0107	Application Explicit Input to PLC Buffer	ABy500	rt	Task Expert Application sets the Explicit Input buffer to send to PLC. The RST sends to PLC upon read request by PLC. This capability is available for explicit messaging and for ABRIO Block Transfer messaging only.

pd0108	Application Explicit Input from PLC Length	US	rt	Task Expert Application set this field to indicate length of data in the Explicit Input to PLC buffer.
pd0110	Application Send Cyclic Output Command	BI	rc	Application sets from 0 to 1 to send new cyclic data to PLC.
pd0112	Received New Cyclic Input Status	BI	rc	RST sets from 0 to 1 to alert application for new data cyclic received.
■ pd0114 and pd0116 must be used together: If the value in pd0116 is zero, then the value from pdf0114 will write to the analog output.				
pd0114	Analog Output Value	D	rt	Application uses this value to control Analog Output values.
pd0116	Analog Out Error Signal	BI	rt	Application uses this value to control Analog Output Discrete Error.
pd0118	Display Data Output from PLC	S20	rt	RST sets this when PLC command sends new display data.
pd0119	PLC Display Command Byte	By	rt	0 = Clear Display Message 1 = Display Message Table message 1 (aw0101) 2 = Display Message Table message 2 (aw0102) 3 = Display Message Table message 3 (aw0103) 4 = Display Message Table message 4 (aw0104) 5 = Display Message Table message 5 (aw0105) 6 = Start ID1 prompt sequence 7 = Display text in pd0118 8 = Start ID2 prompt sequence.

7.5.2.2. Method

The IND500X allows the Application to directly control the PLC Messaging. This option can be selected in Setup. Other options allow the Resident Scale Task to process the PLC messages. When controlling the PLC messaging, the Application must be keenly aware of the capabilities and limitations of the particular PLC protocol.

The Application uses the "pd" block to affect its direct control over the PLC message data. Using this block, the Application can directly access the PLC message data. This block also has triggers that the Resident Scale Task and Application use to signal each other when another buffer is ready.

The Resident Scale Task maintains "cyclic" and "explicit" message buffers for both input and output messages. Cyclic messages are scheduled messages that occur on a periodic basis, for example, once every 50 milliseconds. All PLC protocols support cyclic messaging. Cyclic messages typically contain dynamic data, such as weight data or weight status, which is continuously changing.

Explicit messages are unscheduled messages that occur on demand by the PLC. They are typically request-response message exchanges that the PLC initiates. In a good system design, they should

occur much less frequently than the cyclic messages. One good use for explicit messages in IND500X systems is in reading and writing Shared Data. For example, explicit messages can set a Target coincidence value. Not all PLC protocols support the concept of explicit messages; in which case, the Application must embed the explicit message capability inside the cyclic messaging.

The IND500X allows the Application to control directly the Analog Output signal level. This option can be selected in theSetup menu tree. Other options allow the Resident Scale Task to control the signal level. When in control, the Application writes to Shared Data fields in the pd block to control the signal.

7.6. Barcode Data

7.6.1. ASCII Input Message (MB)

Access:	"All Users" Access		
Class Code:		Data Type:	D
Instances:	1		

7.6.1.1. Attributes

mb0101	ASCII Input Message	S100	na	Resident Serial Services decomposes the message into message blocks according to the Input Message Template
mb0102	Clear Message Block	Bl	rc	The Application must set this to 1 when it is done processing the current message.
mb0103	New Message Received	Bl	rt	Trigger to Application indicating that a new input message is ready for the Application to begin processing. Set trigger to 1 to initiate.

7.6.1.2. Method

Resident Serial Services parses a ASCII/ (barcode) Input string based on the message definition in the ASCII (barcode) Template (bt) Setup fields, and stores the parsed message in the Shared Data Message Block. The Data Connections (dc) Setup fields assign the bt input message to a Serial port.

The Serial Services buffers serial port input data. The Serial Services copies the next message from its buffer into the mb0101 Shared Data field, and sets the mb0103 trigger to alert the Application that a new message is ready. When the Application has completed processing the current message block, it must set the mb0102 trigger to the clear the message block. Then, the Serial Services can again copy the next message from its buffer to the message block.

7.6.2. ASCII Input Templates Setup (BT)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

7.6.2.1. Attributes

bt0101	Preamble Length	By	Na	Length of data ignored at beginning of message.

bt0102	Max Data Length	By	na	Maximum input data length.	
bt0103	Postamble Length	By	na	Length of data ignored at end of message before the termination character.	
bt0104	Termination Character	By	na	Terminate input whenever this character is encountered.	
bt0105	Input Template Assignment	By	na	0 = Application 1 = Tare value 2 = Tare ID 3 = Target ID	4 = ID 1 5 = Keypad 6 = Target Weigh-in 7 = Target Weigh-out

7.6.2.2. Method

Resident Serial Services parses an ASCII Input string based on the message definition in the ASCII (barcode) Template (BT) Setup fields and stores the message in the Shared Data Message Block. The Data Connections (DC) Setup fields assign the BT template processing to a Serial or USB input port.

8 Other Data

8.1. Display and Keyboard Data

8.1.1. Power-Up Weight Display (XA)

Access:	"Service" Level Access, customizable by individual field
Class Code:	Data Type: PS
Instances:	1

8.1.1.1. Attributes

xa0101	Set Weight Display Visible	By	rt	1 = Set Visible (default). 2 = Set Invisible	
xa0102	Set SmartTrac™ Display Visible	By	rt	1 = Set Visible. 2 = Set Invisible (default).	
xa0111	Weight Display Height	By	rt	0 = None 1 = Small (17 dots/6.1mm)	2 = Medium (37 dots/11.2mm) 3 = Large (74 dots/16.9mm)
xa0114	Rate Display	By	rt	1 = Set visible. 0 = Set invisible.	
xa0115	Display mode of target table	By	rt	0 = None 1 = Material Transfer	3 = Over/Under
xa0116	SmartTrac™ Height	By	rt	0 = None 1 = Small	2 =Medium (default) 3 = Large
xa0119	DIO status	By	rt	DIO status to be shown on the home page. 1 = Set Visible (default), 2 = Set Invisible	
xa0120	Metrology Line	By	rt	1 = Set Visible (default, Cap/d), 2 = Set Invisible, 3 = Set Visible (Max/Min/e)	

8.1.1.2. Method

This block contains power-up settings for the weight and SmartTrac™ display. Changes only take effect on power-up. To have the Application change weight display appearance dynamically, use the XB block.

When Rate display (xa0114), SmartTrac (xa0116) and DIO status (xa0119) are set as visible, only SmartTrac is visible on screen. The order of priority is: SmartTrac, Rate display, DIO status.

SmartTrac Weight Display

None – Large	xa0101=1, xa0102=2, xa0111=3, xa0116=0
Small – Medium	xa0101=1, xa0102=1, xa0111=2, xa0116=1
Medium – Small	xa0101=1, xa0102=1, xa0111=1, xa0116=2

Large – None xa0101=2, xa0102=1, xa0111=0, xa0116=3

8.1.2. Dynamic Weight Display Commands (XB)

Access:	"All Users" Access
Class Code:	Data Type: D
Instances:	1

8.1.2.1. Attributes

xb0101	Set Weight Display Visible	By	rt	0 = Use Default in xa0101 1 = Set Visible	2 = Set Invisible
xb0102	Set SmartTrac™ Display Visible	By	rt	0 = Use Default in xa0102 1 = Set Visible	2 = Set Invisible
xb0111	Set Weight Display Height	By	rt	0 = Use default in xa0111 1 = Small (17 dots/6.1mm)	2 = Medium (37 dots/11.2mm) 3 = Large (74 dots/16.9mm)
xb0114	Rate Display	By	rt	0 = Use default in xa0114, 1 = Visible, 2 = Invisible	
xb0115	Set SmartTrac™ Type	By	rt	0 = Use default per target type 3 = Three Zones	1 = Bar graph
xb0116	Set SmartTrac™ Height	By	rt	0 = Use default in xa0116 1 = Small	2 = Medium 3 = Large
xb0117	Target Driving SmartTrac™ Display	By	rt	0 = Use default in xa0117	
xb0119	DIO Status	By	rt	0 = Use default in xa0119, 1 = Visible, 2 = Invisible	
xb0120	Set Metrology Line Visible TE	By	rt	0 = Use default in xa0120 2 = Set invisible	1 = Set visible (default, Cap/d) 3 = Set Visible (Max/Min/e)

8.1.2.2. Method

The Control Panel or custom Application can set this block to set parameters for the display.

8.1.3. Dynamic Display Positions (XY)

Access:	"All Users" Access	
Class Code:		Data Type: D
Instances:	7	Instance 1 = System Message Display Instance 2 = Digital Weight and SmartTrac™ Visualization Display Instance 3 = Softkey Display Instance 4 = Control Panel Display Instance 5 = Reserved Instance 6 = Reserved Instance 7 = Task Expert Display

8.1.3.1. Attributes

xy--01	Visible	BI	rt	0 = No. 1 = Yes
xy--03	Starting Y coordinate	US	rt	Starting vertical pixel position for the display area. Allowed values = 1to128.

8.1.3.2. Method

Tasks associated with each instance of the display area must maintain the position data describing their display windows. Other tasks use this data to configure their own display positions and window sizes.

- The System Message/Error task maintains Instance 1
- The Weight Display and SmartTrac Visualization task maintains Instance 2
- The Control Panel maintains Instance 4
- The Softkey Manager maintains 3
- Instance 5 and 6 are reserved
- The Task Expert Language Interpreter maintains Instance 7

8.1.4. Keyboard Routing Commands (KC)

Access:	"Operator" default level		
Class Code:		Data Type:	D
Instances:	1		

8.1.4.1. Attributes

Keyboard Routing Tables

kc0110	Route Keypad Numeric Keys to Selection	By	rt	3 = Disabled 4 = Task Expert else = Control Panel
kc0111	Route Keyboard AlphaNumerics to Selection	By	rt	3 = Disabled 4 = Task Expert else = Control Panel
kc0112	Route Enter Key to Selection	By	rt	
kc0113	Route Navigation Keys to Selection	By	rt	

kc0114	Route Scale Keys to Selection	By	rt	
kc0115	Route Clear Key to Selection	By	rt	
kc0116	Route Function Keys to Selection	By	rt	

Softkey Processing Commands

kc0119	Disable Softkey Display	By	rt	Command from Application to Softkey Manager to disable and turn-off Softkey display.
kc0120	Go to Home Softkey page	By	rc	Command from Application to Softkey Manager = Reset Softkey Stack, display Home page, and begin processing it.
kc0124	Replace current top page	By	rc	Command from Application to Softkey Manager = Replace the current top page with the working page and begin to processing the new top.

Data Entry Line Commands

kc0130	Enable Data Entry Line	By	rt	Command from Application to Softkey Manager. 0 = Disable 1 = Enable with prompt in pre-entry mode 2 = Enable with no prompt in pre-entry mode 3 = Enable with prompt in specific entry mode 4 = Enable with no prompt in specific entry mode
kc0132	Pre-Entry Prompt for Data Entry	S21	rt	The application can specify a prompt message that Softkey manager displays at the beginning of the data entry line in pre-entry mode.
kc0133	Specific Prompt for Data Entry	S21	rt	The message that Softkey manager displays at the beginning of the data entry line in specific-entry mode.
kc0134	Format for a Specific Data Entry	S8	rt	The application can specify a numeric data format with a maximum number of digits and position of the decimal point. The format is "#nn.dd" where nn is the max number of numeric digits and dd is the decimal point position. Or the application can specify an alphanumeric data format with a maximum number of characters for alphanumeric data. The format is "!ss" where ss is the maximum number of alphanumeric characters.
kc0135	Format for Pre-Entry Data	S8	rt	The application can specify a numeric data or alphanumeric data format for data the operator enters in "pre-entry" mode. The format is the same as kc0134.
kc0136	Data Entry Line Data	S40	rt	The Softkey Manager records data here that the operator entered on the data entry line. The last character of the buffer contains the termination character.

8.1.4.2. Method

The Softkey Manager sends a custom message containing the Softkeys to the Message Window of the appropriate application. Each application must write its Message Window handle to Shared Data in order to receive the messages. Before an application terminates, it must clear its Message Window handle.

Other fields are commands from the applications to the Softkey Manager to control processing of the Softkey pages.

8.1.5. Static Home Softkey Page (KH)

Access:	"Service" default level		
Class Code:		Data Type:	PS
Instances:	1		

8.1.5.1. Attributes

kh0105	Sofkey 1	S50	rt	See description in "kp" block
kh0106-0118	Softkeys 2-14	S50	rt	See description in "kp" block
kh0119	Softkey 15	S50	rt	See description in "kp" block

8.1.5.2. Method

The Softkey Manager uses this Static Home Page from permanently stored flash memory to initialize the Dynamic Softkey Home Page, kp0100, to begin processing the softkeys. The Control Panel application configures the Home Page.

8.1.6. Dynamic Softkey Page Stack (KP)

Access:	"Operator" default level		
Class Code:		Data Type:	D
Instances:	8	Instance 1 is the home page Instance 2 is the current page Instance 3-7 are Reserved Instance 8 is the Application working page	

8.1.6.1. Attributes

kp--05	Softkey 1	S50	rt	A multi-part string containing: "Application Index, Softkey Identifier, Text Message Index, Graphics file name, program name", where
kp--06-18	Softkeys 2-14	S50	rt	

kp--19	Softkey 15	S50	rt	• Application index points to the application that processes the key. <100 = Softkey index processes by Control Panel. If this Index is used, there is no Softkey Identifieror Graphics file name 100 = Task Expert Application. The Softkey Manager sends the key to the Task Expert Window. • The Application must define an integer "Softkey Identifier" for each softkey in the softkey stack. The Softkey Manager (SKM) sends this identifier in each softkey message that it sends to a destination application when the operator selects this softkey. • Graphics file name is a bit-map file used to draw the icon for the softkey. A NULL String entry in this field indicates that there is no "application key" or "softkey" associated with this entry.

8.1.6.2. Method

The Softkey Manager uses the Dynamic Softkey page stack to manage the display and to control the processing of the IND500x softkeys. Each page instance represents all the softkeys used at one time. The Softkey Manager displays the keys within an instance in the order the Application writes them to Shared Data.

You can design your application to run so that the Softkey Manager only processes the Home Page and the Current Page – not the stack. For example, every Application Form loads a new Softkey image each time a new Application Form loads. The Application Form writes its Softkey image to the working image. Then, it issues the command kc0124 to replace the current page with the working page. After Form A starts Form B, Form A "closes" itself so that it is reloaded each time it restarts.

Custom TaskExpert Applications can rewrite the Dynamic Home Page to insert or remove their own softkeys. When the IND500x first starts up, the Softkey Manager initializes the Dynamic Home Page, kp0100, from the Static Home Page, kh0100, defined in Setup. The custom Application reas the Dynamic Home Page, inserts its own softkeys in any order into the Softkey page, and re-writes the Dynamic Home Page into Shared Data. The Softkey Manager rewrites the Softkey image on the display from the Dynamic Home Page. A custom Application must never modify the Static Home Page

8.1.6.2.1. Basic Functionality Home Position Softkeys

- All Softkey graphic files are .bmp type bitmap files.

Function	Index	Graphic File
Adjust Contrast	1	contrast
Alibi	2	alibi
Calibration Test	3	cal_test
Recall Info	4	recall

Function	Index	Graphic File
ID4	53	n/a
MinWeigh	31	minweigh
Comparators	39	comprtr
Trigger 1	40	trigger1

Function	Index	Graphic File
Reports	5	reports
Setup	6	setup
SmartTrac	7	Sm_trac
Tare Table	8	tare_mem
Target	9	target
Target Control	10	control
Target Table	11	targ_mem
Target Start	12	start
Time & Date	13	timedate
Unit Switching	14	select
X10 Display	15	x10
ID/ID1	19	id
ID2	51	n/a
ID3	52	n/a

Function	Index	Graphic File
Trigger 2	41	trigger2
Trigger 3	42	trigger3
Task list	38	tasklist
GPW	55	GWP
Repeat Print	43	rpt_prnt
Dynamic Start	44	inMot
Dynamic Test	45	Dyn_test
Task 1	46	task1
Task 2	47	task2
Task 3	48	Task3
Reset Trans. Cntr	49	reset.
Permanent ID (specific to Drive570)	201	permid
Temporary ID (specific to Drive570)	202	tempID
USB	54	USB

8.1.6.2.2. Fill-570 Home Position Softkeys

Function	Index	Graphic File
Container Tare	16	cntnr_tr
Cycles	17	cycles
Formula	18	formula
Weigh-in Start	20	weigh_in
Weigh-out Start	21	weighout
Container Tare Table	35	cntnr_m
Target Weigh-in	33	targ_in
Target Weigh-out	34	targ_out

8.1.6.2.3. Drive PAC Home Position Softkeys

Function	Index	Graphic File
Permanent ID	201	permid
Temporary ID	202	tempid
Permanent ID Table	203	permtable
Temporary ID Table	204	temptable

8.1.6.2.4. Dynamic PAC Home Position Softkeys

Function	Index	Graphic File
Dynamic Test	45	dyn_test
Start Dynamic Operation	44	Inmot

Function	Index	Graphic File
Stop Dynamic Operation	??	??

8.2. System Status and Setup Data

8.2.1. System State (XD)

Access:	"Read Only" Access. xd0153 has "Administrator" Level Access.
Class Code:	0x65 Data Type: D
Instances:	1

8.2.1.1. Attributes

xd0103	Current Date	S12	na	Format defined in xs0110	
xd0104	Time of Day	S12	na	Format defined in xs0111	
xd0131	System Setup State	By	rt	0 = Normal Run State. 1 = Setup State.	
xd0139	Mainboard Switch settings	By	na	Settings of the 2 toggle switches on the baseboard.	
				None = 0 Switch 2-2 = 2 Switch 1-1 = 4 Switch 1-1 & 1-2 = 12	Switch 2-1 = 1 Switch 2-1 & 2-2 = 3 Switch 1-2 = 8
xd0151	Read Hardware Key Image	ABy48	na	Pac Hardware Key (iButton EEPROM) Read Image	
xd0153	Current System Message Display	S21	rt	A system line message will be written over and over, indefinitely, until xd0153 is written as a blank by the Application. In order to write a message to the System Message line, the Application should first read this field to make sure it is clear and then write the new message.	
xd0170	TE checksum	S81	rt		
xd0178	System error alarm	BI	rt	I/O assignment to system error	
xd0179	System OK	BI	rt	I/O assignment to system OK	

8.2.1.2. Methods

This block shows the current state of the IND500x system.

The IND500x only updates date and time fields when an Application or RST attempts to access these fields. The IND500x updates the clock tick fields regularly so an Application may use these fields for periodic callbacks. xs0110 and xs0111 contain the format specification for the date and time.

The Consolidated Weight Stream (CWS) is a string that contains the weight on the scale on the IND500x terminal.

- Within this field, the weight is metrologically consistent among gross, net, and tare weights. We cannot guarantee this when the Application does individual reads because they occur at different times.
- It is more efficient to get all the data in one access instead of multiple accesses.
- An Application can access the CWS either locally or remotely.

The IND500x sets data in the CWS according to field xp0102, where the Application subscribes to the fields it wants reported. The format of xp0102 is S<ABCDE>T where ABCDE represents the scales, S represents the selected scale and T is the Time. "S" is mutually exclusive from ABCDE.

The Consolidated Weight Stream has the following format: stream <1><US><stream 2><US><stream n>, and it may contain time, display, and Application messages inserted in the output stream, with <US> separating the fields. Each weight stream has the following contents:

<Node ID>	1N	Range: 1 to 20 IND500x is fixed at 1	
<Scale ID>	1A	Range: A to E. If selected scale, range is in lower case <a to e>. It is always A in the IND500x.	
<Status>	1C	Bit 7	Always 0
		Bit 6	Always 1
		Bit 5	1 = Scale in Motion
		Bit 4	1 = Center of Zero
		Bit 3-2	00 = Single Range
			01 = Weight Range 1
			02 = Weight Range 2
			03 = Weight Range 3
		Bit 1	1 = Net Mode
		Bit 0	1 = Preset Tare
<Units>	1N	0=None 1=lb 2=kg 3=g 4=t 5=ton 6=toz 7=dwt 8=oz 9=custom	
<Net Wt>	10N	8 digits plus possible "-" and "."	
		"^^^^^^^^^^" indicates the gross weight on scale is over capacity.	
		"vvvvvvvvvv" indicates the gross weight is less than zero.	
		"----------" indicates an indeterminate weight.	
<Tare Wt>	10N	8 digits plus possible "-" and "."	

8.2.1.3. System OK Condition, xd180

Bytes	Byte Value	No.	Description
Byte1	128	1	Power Up Zero Not Captured
	64	2	COM4 Error
	32	3	COM5 Error

Bytes	Byte Value	No.	Description
	16	4	Remote 1.0.x Error Remote 2.0.x Error Remote 3.0.x Error
	8	5	File open error
	1	8	Fatal Symmetry Error
Byte2	128	9	Fatal LC com error
	64	10	Fatal Zero Drift Error
	32	11	Connect IDNet Base
	16	12	MELSI Error
	8	14	Remote Scale – No Data Transfer
	4	15	Excitation Voltage Below Limit
	2	16	Scale Blanked Over Capacity
Byte3	128	17	Zero Required
	64	18	No Digital Scale Interface
	32	19	Connect SICSpro Scale
	16	20	Low Supply Voltage
	8	21	Node ***: Not Found
	4	22	Load cell mismatch - Scale disabled
	2	23	Scale Blanked Under Zero

8.2.1.4. Email Error Codes, xd0187

SDV value(error code)	Description
0	Success
20	Password error
21	Need authentication
22	Address error
23	Authentication failed
24	Connection failed
25	Email transmission is started(some keys disabled)
26	Quit command error
27	Timeout
28	Command reply error
29	Socket error
30	SMTP code error
31	Parameter error.
32	Other error
33	Program error.

8.2.2. System Logs Setup Data (XR)

Access:	"Maintenance" Level Access, customizable by individual field except xr0203, xr0303, xr0403, and xr0503, which are "Administrator" level.	
Class Code:		Data Type: PS
Instances:	75	Instance 1 = Monitor/Maintenance Log Instance 2 = Alibi Memory Log Instance 3 = Rreserved Instance 4 = Reserved Instance 5 = Shared Data Configuration History Log Instance 6 = Reserved Instance 7 = Error Log Instance 8 = Filling action log Instance 9 = DrumFilling action log Note: Only instances 1, 2, 3, 6 and 7 can be enabled/disabled.

8.2.2.1. Attributes

xr--03	Enable logging	BI	rt	Is file logging enabled or not? 0 = No. 1 = Yes For xr0203, 0 = No, 1 = Alibi Memory enabled, 2 = Action Log enabled.

8.2.2.2. Method

The IND500x maintains 7 log files in Compact Flash. The Service Technician can use FTP to transmit each of these files to a host PC. These files can also be copied to USB memory. The log files are circular log files. The Log Files are circular files where the IND500x re-writes the oldest record first. However, The IND500x does not overwrite the oldest record in the Change Log until the user clears the log.

The Monitor Log is a circular log file that contains a record of the significant processing events that may affect the "health" of the scale system. It aids the Service Technician in resolving problems and in deciding what service the IND500x requires. The Service Technician can select the items recorded in the log. The "Scale Monitoring Setup" block in Shared Data holds these selections.

The Transaction Log (Alibi Memory) is circular log file that contains historical record of all the transactions performed on the IND500x. The Demand Print operation defines a transaction in the IND500x; the Demand Print Setup block specifies the requirements for legal Demand Print operations. Each Alibi Memory record has a fixed format field containing the date, time, scale identifier, net weight, tare weight, tare source, and consecutive number for each transaction. The user may specify a special Print Template for additional data that the IND500x adds to each record.

The Calibration Log is a circular log file that maintains the history of all the scale calibrations and calibration checks.

The "Configuration History" is a circular log file that contains a complete record of the changes made to Shared Data Setup and Calibration fields. It provides an audit trail of all the changes that the Service Technician has made to the IND500x since its initial installation. This historical record is a requirement in the pharmaceutical and food industries, where companies must prove their

compliance with governmental regulations. The IND500x provides warnings to the operator when this file is becoming full and disables itself when this file is finally full. Then, the Service Technician must use FTP to save the log file to a remote PC and reset the file before the IND500x will continue.

The Maintenance Log is a circular log file that contains a record of the significant processing events that may affect the "health" of the scale system. It aids the Service Technician in resolving problems and in deciding what service he needs to perform on the IND500x. The Service Technician can select the items recorded in the log. The "Scale Monitoring Setup" block (cm) in Shared Data holds these selections.

The Alibi Memory Log is circular log file that contains a historical record of all the transactions performed on the IND500x. The Demand Print operation defines a transaction on the IND500x; the Demand Print Setup block specifies the requirements for legal Demand Print operations. Each Alibi Memory record has a fixed format field containing the date, time, scale identifier, net weight, tare weight, tare source, and consecutive number for each transaction.

Alternatively, the Action Log can be enabled in setup that will log the time and date of certain actions and a text string explaining what the action was. The time and date information should be the fixed "time stamp" format. If enabled, this log file will use the file space normally available to the Alibi memory. It is not possible to have both Alibi memory and Action log at the same time. This log file should operate the same as Alibi memory in that it creates a small file in battery-backed RAM and then transfers the data to flash when the file reaches a certain size. This file should be called Act_Log.csv and it should be available as a comma delimited file through the shared data server (serial interface) or FTP (Ethernet interface). The IND500x supports a 16000-event action log.

The Change Log is a circular log file that contains a complete record of the changes made to Shared Data Setup and Calibration fields. It provides an audit trail of all the changes that the Service Technician has made to the IND500x since its initial installation. This historical record is a requirement in the pharmaceutical and food industries, where companies must prove their compliance with governmental regulations. The IND500x provides warnings to the operator when this file is becoming full and disables itself when this file is finally full. Then, the Service Technician must use FTP to save the log file to a remote PC and reset the file before the IND500x will continue.

The GWP Log is a circular log file that contains the results of Sensitivity, Eccentricity Test and Repeatability Test. The records include Date, Time, User ID, GWP Test and Status.

8.2.3. Transaction Number Setup (XN)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

8.2.3.1. Attributes

xn0101	Transaction Number Enable	BI	na	0 = No. 1 = Yes
xn0105	Enable Transaction Number Reset	BI	na	0 = No. 1 = Yes.

8.2.3.2. Method

The Resident Scale Task increments the Transaction Number (TN) each time the IND500x receives a "Demand Print" request for the specified print destination. Range is 1-999,999,999. The user may specify starting value for the TN register in the "Preset". The Weights and Measures seal does not protect the TN configuration.

8.2.4. System Setup (XS)

Access:	"Maintenance" Level Access The following fields have "Administrator" Level Security: xs0100, xs0101, xs0102, xs0122, and xs0128. The following fields are "Read Only": xs0103, xs0104, xs0133, xs0134, xs0151 and xs0152.
Class Code:	0x6A Data Type: PS
Instances:	1

8.2.4.1. Attributes

xs0101	Market	By	na	0 = USA 1 = European Community 2 = Australia 3 = Canada	4 = Argentina 5 = Thailand 6 = Korea
xs0102	Legal for Trade	By	na	0 = No. 1 = Yes.	
xs0103	Software ID	S21	na	Software version	
xs0104	Software Part Number	S15	na	Part #s are 14 digits + null terminator	
xs0105	IND500x Serial #	S14	na	Serial #s are 13 digits + null terminator	
xs0106	IND500x ID	S21	na	Terminal ID (Terminal ID#1 in menu)	
xs0107	IND500x Project ID	S21	na	Project ID (Terminal ID#2 in menu)	
xs0108	IND500x Terminal ID	S161	na	User Text Description of the IND500x (Terminal ID#3 in menu)	
xs0110	Date Format	By	na	1 = MM_DD_YY 2 = MMM_DD_YYYY 3 = DD_MM_YY 4 = DD_MMM_YYYY	5 = YY_MM_DD 6 = YYYY_MMM_DD 7 = YYYY_MM_DD 0 = none
xs0111	Time Format	By	na	1 = 24_MM 2 = 12_MM	3 =24_MM_SS 4 = 12_MM_SS
xs0112	Date Separator	S2	na	/"= Slash - = Hyphen . = Period	" " = Space 0 = None
xs0115	Operator Message Language	By	na	0 = English 1 = French 2 = German 3 = Spanish	4 = Chinese 5 = Italian
xs0121	IND500xx Backlight Timeout	US	na	In minutes	

xs0122	Local Gravity "Geo" Code	By	na	Value from 0-31. This value represents the gravitational acceleration depending on the latitude and altitude at this specific location where the IND500x is now operating. The IND500x uses it to adjust the weight value when you calibrate it in one location and use it in a different region of the world. Any value other than 0-31 disables this feature.

Hardware Configuration

xs0127	# Nodes in Remote Discrete IO Unit	By	na	1-3 nodes. RST automatically sets during system installation and verifies at power up.
xs0128	Restart/Reset Units at Power Up	By	na	0 = Start up at primary weigh units 1 = Restart at current weigh unit
xs0130	Keypad Language	By	rt	1 = Global 2 = English
xs0132	IND500x Display Backlight	Bl	na	0 = Enable. 1 = Disable.
xs0135	Screen Saver	L	na	# of minutes of inactivity before turning off display. 0 = turn off screen saver 30 = default
xs0138	Second Shared Data Server Port	L	na	The IND500x always has a default Shared Data Server open on port 1701. If xs0138 is not 0 or 1701, IND500x will open a 2nd instance of the Shared Data Server on this assigned port #. Default = 0. Values of 0 and 1701 disable the second port. No validation for the entry value is performed by the terminal.
xs0143	FIII-570 Software ID Number	S40	na	Text description of installed software
xs0150	IND500x Boot Software ID Number	S21	na	Text description of boot loader/code installed in terminal
xs0151	iButton EEROM Option Image	ABY48	na	Permanent iButton image
xs0152	iButton Target Product	By	na	
xs0155	Duplicate Print	By	na	Marks printout as a "DUPLICATE" 0 = Disabled. 1 = Footer. 2 = Header.
xs0157	Auto Power Off	By	na	0 = Disable, (Default) 1 = 10 minutes, 2 = 30 minutes, 3 = 60 minutes
xs0158	Reconnect Mode	By	na	0 = Manual (Default) 1 = Automatic,
xs0168	Comma/Decimal	By	na	0 = Decimal (default), 1 = Comma
xs0169	Gross Legend	S4	na	"G" (default), 3 bytes at most
xs0170	Contrast adjustment	By	rt	Adjust the contrast of the display, values from 17 to 50 (0x11 to 0x32)
xs0172	Approval description	S81	na	Approval line of text in Metrology recall

8.2.4.2. Method

The following table shows the functionality changes in Legal-for-Trade mode (xs0102) for specific markets (xs0101):

Functionality	Market					
	USA	EU	Australia	Canada	Argentina	Thai-Veh
Screensaver Disabled						X
Backlight Timeout Disabled						X
SD writes not allowed by external client connection					X	
Serial option cards not supported						X
RS422/485 functionality disabled (COM2)						X
SICS Server not supported					X	
Sum scale indicates under zero if any scale included in the sum is below zero gross.			X			
Chain tare disabled	X					
Tare allowed only in rounded increments				X		
Center of Zero divisions	0.25	0.25	0.25	0.20	0.25	0.25
Custom Apps cannot overlay legal weight display	X	X	X	X	X	X
Inhibit printing in X10 mode	X	X	X	X	X	X
One second delay before updating print completion	X	X	X	X	X	X

8.2.5. System Monitoring & Service Data (XP)

Access:	"Maintenance" Level Access.		
Class Code:	0xAC	Data Type:	PP
Instances:	1		

8.2.5.1. Attributes

xp0101	Transaction Counter	UL	na	Transactions counter incremented according to the Transaction Counter Setup.
xp0121	Last Error (1 of 5)	S81	rt	Error Code; Date, time
xp0122	Last Error (2 of 5)	S81	rt	
xp0123	Last Error (3 of 5)	S81	rt	
xp0124	Last Error (4 of 5)	S81	rt	
xp0125	Last Error (5 of 5)	S81	rt	
xp0126	Service Icon Status	By	na	0 = No Service Icon (default) 1 = Show Service Icon in system line.
xp0128	Last Demand/Custom Template ID	By	na	Template ID of last Custom/Demand print

8.2.5.2. Method

The system usage counters are maintained until a Master Reset occurs. An FTP Shared Data transfer can save these usage counters but cannot restore them. In the event of a Master Reset, all counters are reset.

8.2.6. Setup Sequencing Control (QC)

Access:	"Maintenance" Level Access.		
Class Code:	0x9A	Data Type:	D
Instances:	1		

8.2.6.1. Attributes

qc0148	Enter Setup Mode Command	Bl	rc	Command to CP and RST
qc0149	Exit Setup Mode Command	Bl	rc	Writing qc0149 = 1 is frequently required to "save" or "execute" other Shared Data entries.
qc0161	Restart IND500x	Bl	rc	1 = Perform soft restart of IND500x
qc0168	Reconfigure PLC Thread	By	rc	1 = start, 0 = done
qc0169	Back up BRAM to flash	By	rc	1 = start, 0 = done The application sets this trigger to cause the Resident Scale Task to write the current contents of BRAM to a backup file in the Compact Flash memory. This backup must be performed before the battery is replaced. On power up, Shared Data automatically recovers the BRAM file from the flash backup file.
qc0170	CP Starting the Task Expert Application	By	rt	1 = Start Task Expert Setup Application
qc0182	The test of "Approval" and SW1-1	By	rc	Set field to "1" to initiate a check of the security switch (SW1-1)

qc0189	Remote Tare/Target Command	By	rt	This field enables a PC or PLC remotely set a new active Tare, Target, Weigh-in Target or Weigh-out Target from the standard IND500x tables. The Tare Table or Target Table record ID must first be set in qc0190 before issuing the command in qc0189. Command values: The PC/PLC sets commands in this field, as follows: 1 = Set an active Tare for scale from the Tare Table using ID in qc0190. 6 = Set an active Target for scale from Target Table using ID is in qc0190 ("6" can also be used to activate Dynamic Target from Dynamic Target Table if Dyn-570 is installed) 11 = Set an active Weigh-in Target for scale from Target Table using ID is in qc0190 16 = Set an active Weigh-out Target for scale from Target Table using ID is in qc0190 Status values: The IND500x sets the status of the command back in this same field, as follows: Command in progress = 255 No matching database record found = 254 Successful completion = 0 Database record values: Upon successful completion, the IND500x has also written the recalled Tare Table or Target Table record to the appropriate fields of the TD block (standard functionality) or the appropriate fields of the AR, AF and AP block (Fill-570), where the PC/PLC can read them.

8.2.7. Board Identifications (BD)

Access:	"Read Only" Access	
Class Code:		Data Type: D
Instances:	15	Instance 1 = Main Board Instance 2 = Analog Scale Option Instance 3 = Digital Scale Option Instance 4 = Base (Digital Scale) Instance 5 = COM Option Instance 7 = Analog Output Option Instance 9 = ACM500 Instance 10 = Ethernet Instance 11 = iButton Instance 12 = Ethernet & COM Instance 13 = PLC

8.2.7.1. Attributes

bd--01	Board Installed This Slot	BI	na	0 = No. 1 = Yes.
bd--02	Description	S21	na	Refer to section 8.2.7.2
bd--03	Board Serial Number	S17	na	Serial numbers are 16 digits plus null terminator.
bd--04	Board Part Number	S15	na	Part numbers are 13 plus null terminator
bd--05	Board Type	By	na	Refer to section 8.2.7.2
bd--06	Board Location	By	na	Refer to section 8.2.7.2
bd--10	Product Year and Week	S5	na	Format: YYWW plus null terminator
bd--11	Version	S3	na	Revision level of board, RR plus null terminator

8.2.7.2. Method

At power-up, the Resident Scale Task reads the hardware boards and writes their identification to Shared Data. The following table gives examples.

Instance 1	Model Description	
	bd0102	IND500x
	bd0105	1 = Main Board
	bd0106	0 = None
Instance 2	Analog Option	
	bd0201	1 = Present
	bd0205	2 = Analog option
	bd0206	1 = Slot 1
Instance 3	Digital Option	
	bd0301	1 = Present
	bd0305	3 = Digital Option 4 = Digital Option (passive)
	bd0306	1 = Slot 1

Instance 4	Base (Digital Scale)	
	bd0401	1 = Digital Scale present
	bd0405	19 = SICSPro Scale 20 = IDNet Scale
Instance 5	COM Option	
	bd0501	1 = Present
	bd0505	5 = COM Option
	bd0506	2 = Slot 2
Instance 7	Analog Output Option	
	Bd0701	1 = Present
	bd0705	2 = Analog Output
	bd0706	3 = Slot 3 4 = Slot 4 99 = in ACM500
Instance 9	ACM500	
	bd0901	1 = Present
	bd0905	11 = ACM500 CL 12 = ACM500 FO
Instance 10	Ethernet	
	bd1001	1 = Present
	bd1005	13 = Ethernet
	Bd1006	4 = Slot 4
Instance 11	iButton	
	bd1101	1 = Present
	bd1105	14 = iButton
Instance 12	Ethernet & COM	
	bd1201	1 = Present
	bd1205	14 = Ethernet & COM
	bd1206	99 = in ACM500
Instance 13	PLC	
	bd1301	1 = Present
	bd1305	16 = PROFIBUS DB 17 = EtherNet/IP 18 = PROFINET
	bd1306	99 = in ACM500

8.2.7.2.1. Remote IO

The IND500x can support up to three ARM100 nodes, providing that there is no internal I/O board installed. If the ARM100 is connected with IND500x:

bd1401	ARM100 Connected	1 = Yes 0 = No
bd1405	Number of ARM100s Connected	1 = 1 ARM100 3 = 2 ARM100s 7 = 3 ARM100s

8.2.8. Connected Devices (ED)

Access:	"Service" default level, customizable by individual field		
Class Code:	ed	Data Type:	
Instances:	7		

8.2.8.1. Attributes

ed--01	Description	S41	na	Description of a device
ed--02	Model	S21	na	Model of a device
ed--03	Note	S31	na	Notes concerning a device

8.2.9. System Feature Triggers & Controls (XC)

Access:	"Supervisor" Level Access		
Class Code:	0x96	Data Type:	D
Instances:	1		

8.2.9.1. Triggers to disable features through a Discrete Input Keyswitch

xc0104	Disable Setup	BI	rt	0 = Enable entry to Setup entry via terminal Softkey. 1 = Disable entry to Setup entry via terminal Softkey.
xc0106	Disable Terminal Keypad	BI	rt	0 = Enabled. 1 = Disabled.

8.2.9.2. Triggers to activate/deactivate Ladder Logic

xc0112	Master Control Relay	BI	rt	Master switch for turning on/off all discrete outputs. 1 = Discrete outputs enabled 0 = Discrete outputs disabled
xc0113	Run Ladder Logic	BI	Rc	Run ladder logic
xc0114	Stop Ladder Logic	BI	rc	Stop ladder logic

8.2.9.3. Triggers to turn on/off display

xc0115	Disable Display	BI	rt	1 = Disable	0 = Enable

8.2.9.4. Triggers to Initiate Miscellaneous Functions from Discrete Inputs

xc0130	Enter Key Trigger	BI	rc	1 = Same function as pressing Enter key from keyboard
xc0134	Run ID1 (Prompt) Sequence	BI	rc	Set to 1 to initiate ID1 (Prompt) sequence.

xc0136	Operate Strike Enter Key	BI	rc	Key task sets this trigger to 1 when the operation presses the Enter Key.
xc0137	Toggle SmartTrac™	BI	rc	Set to 1 to toggle between already set size and off (refer to XA block).
xc0139	Reprint Last Demand Print	BI	rc	Set to 1 to trigger a reprint of the last demand or custom print. Applications use this trigger for DUPLICATE PRINT requests.
xc0159	Run ID2	BI	rc	1 = Start ID2 sequence
xc0160	Run ID3	BI	rc	1 = Start ID3 sequence
xc0161	Run ID4	BI	rc	1 = Start ID4 sequence

8.2.9.5. Methods

These system triggers enable, disable, or activate IND500x functions through Discrete Inputs. You must setup Ladder Logic rungs to tie the Discrete Inputs to these triggers. Applications may also access these features by writing to these Shared Data triggers.

8.3. Users and Security Data

8.3.1. Logged-In Users of Shared Data Server (XL)

Access:	"Read Only" Access	
Class Code:	Data Type:	D
Instances:	3	Shared Data Server supports up to 3 simultaneous user logins. Terminal front panel supports only one user login at a time.

8.3.1.1. Attributes

xl--01	Logged-On User Name	S13	na	Name of user currently logged-on	
xl--02	Access Privilege Level of User	By	na	1 = Operator 3 = Service	2 = Supervisor 4 = Administrator

8.3.1.2. Methods

These fields will only report data if User security is enabled.

8.3.2. Access Security Setup (XU)

Access:	"Maintenance" Level Access		
Class Code:		Data Type:	PS
Instances:	20		

8.3.2.1. Attributes

xu0102 is read only, and is always 4 (Administrator)
xu0103 is read only, and is always 4 (Administrator)
xu0201 default is anonymous with xu0203 = 1 (Operator access), but can be deleted or modified.

9 Manual Formulation Application

9.1.1. Manual Formulation Application (AX, AV)

Access:	"Service" Level Access, customizable by individual field
Class Code:	Data Type:
Instances:	3

9.1.1.1. Attributes

ax0201	Barcode Enable	US	na	Enables barcode reading as a source of input data. Default value: 0
ax0202	Color for less(high)	US	na	Combines with ax0211 (which creates a UL type for use in US) to set SmartTrac color when the weight is less than the material low threshold.
ax0203	Color in range(high)	US	na	Combines with ax0212 (which creates a UL type for use in US) to set SmartTrac color when the weight is above the the material low threshold and below the material high threshold.
ax0204	Color for Overfill(high)	US	na	Combines with ax0213 (which creates a UL type for use in US) to set SmartTrac color when the weight is above the material high threshold
ax0205	Printing Enable	US	na	1 = Printing enabled.
ax0206	Reserved	US	na	
ax0207	Print Component	US	na	1 = The material formulation information will print after a material is finished.
ax0208	Reserved	US	na	
ax0209	Component log Enable	US	na	1 = The material formulation information will be added to the transaction log.
ax0211	Color for less (low)	US	na	Refer to ax0202.
ax0212	Color in range (low)	US	na	Refer to ax0203.
ax0213	Color for Overfill (low)	US	na	Refer to ax0204.
ax0214	Automatic in Additive	US	na	1 = When one material is finished, the process will switch to the next material.

10 Fill-500x Application

- Important: When the Fill-500x Application PAC is installed in the IND500x terminal, Shared Data definitions that appear in this chapter supersede those found for the same variables in other chapters.

10.1.1. Application Dynamic Commands and Events (AC)

Access:	"All Users" Access		
Class Code:	0x70	Data Type:	D
Instances:	1		

10.1.1.1. Attributes

ac0102	Refill	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0103	Dump	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0104	Start/Resume	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0105	Pause/Abort	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0106	Silence Alarm	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0107	Jog	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0108	NO key	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0109	OK key	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0111	Lance Up	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0112	Lance Down	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0113	Lance in Drum	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0114	Drip pan retracted	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.
ac0115	Drip pan extended	BI	rc	Set to 1 to initiate command. Set to 0 to reset for next command.

10.1.2. Application Dynamic Statuses (AS)

Access:	"All Users" Access		
Class Code:	0x79	Data Type:	D
Instances:	1		

10.1.2.1. Attributes

as0101	OK to Weigh-In	By	rt	Statuses enabling Application to respond to commands. Value switches between 0 (disabled/inactive) and 1 (enabled/active).
as0102	OK to Weigh-Out			
as0107	Complete: Dose	By	rt	
as0108	Complete: Dump	By	rt	
as0109	Complete: Refill	By	rt	
as0110	Complete: Blend	By	rt	
as0111	Alarm	By	rt	
as0112	Auxiliary Out	By	rt	
as0114	Holding	By	rt	
as0119	Out of Tolerance	By	rt	
as0120	Ready	By	rt	
as0121	Running	By	rt	
as0122	Fast Feed	By	rt	
as0123	Feed	By	rt	
as0124	Dump	By	rt	
as0125	Refill	By	rt	
as0126	Fill Start Delay	By	rt	
as0127	After Weigh Delay	By	rt	
as0128	Complete: Cycles	By	rt	
as0129	Complete: Fill	By	rt	
as0145	Lower Lance	By	rt	
as0146	Raise Lance	By	rt	
as0147	Extend Drip Tray	By	rt	
as0201	Smart 5: Starting weight invalid	By	rt	
as0202	Smart 5: Autotare fault	By	rt	
as0203	Smart 5: Process timeout	By	rt	
as0204	Smart 5: Initial feed timeout	By	rt	
as0205	Smart 5: Refill timeout	By	rt	
as0206	Smart 5: Dump timeout	By	rt	
as0207	Smart 5: Parameter invalid	By	rt	
as0208	Smart 5: Parameter logic error	By	rt	
as0209	Smart 5: Insufficient material	By	rt	

10.1.2.2. Methods

Applications may use this block of Shared Data for setting Dynamic statuses. One use is communicating status data with remote tasks over PLC or TCP/IP communications.

10.1.3. Application Floating Point Process Data (AF)

Access:	"Maintenance" Level Access.		
Class Code:	0x7E	Data Type:	PP
Instances:	1		

10.1.3.1. Attributes

af0208	Error Sum	D	rt	Error sum of material in autospill adjustment
af0209	Material Error	D	rt	Error of material
af0251	Active Tare Value	D	rt	Current tare value
af0252	Active Tare Low Limit	D	rt	
af0253	Active Tare High Limit	D	rt	
af0261	Target	D	rt	Recipe target weight
af0262	Spill	D	rt	Recipe spill value
af0263	Fine	D	rt	Recipe fine feed value
af0264	(+) tolerance value	D	rt	Recipe positive tolerance value
af0265(	(-) tolerance value	D	rt	Recipe negative tolerance value
af0266	(+) tolerance percent	D	rt	Recipe positive tolerance value, expressed in percent
af0267	(-) tolerance percent	D	rt	Recipe negative tolerance value, expressed in percent
af0268	Refill tare value	D	rt	
af0270	MULcycle total wt in cycle unit	D	rt	
af0301	Partial dose gross wt.	D	rt	
af0302	Partial dose net wt.	D	rt	
af0303	Final dose net wt.	D	rt	
af0304	Dump gross start	D	rt	
af0305	Dump net weight	D	rt	
af0310	Recipe Auxiliary On	D	rt	
af0311	Formula Auxiliary Off	D	rt	
af0312	Auxiliary Output On Duration (seconds)	D	rt	
af0331	Statistics weight 1	D	rt	
af0332	Statistics weight 2	D	rt	
af0333	Statistics weight 3	D	rt	
af0334	Statistics weight 4	D	rt	
af0335	Statistics weight 5	D	rt	
af0336	Statistics weight 6	D	rt	

af0337	Statistics weight 7	D	rt	
af0338	Statistics weight 8	D	rt	
af0339	Statistics weight 9	D	rt	
af0340	Statistics weight 10	D	rt	
af0341	Statistics weight 11	D	rt	
af0342	Statistics weight 12	D	rt	
af0343	Statistics weight 13	D	rt	
af0344	Statistics weight 14	D	rt	
af0345	Statistics weight 15	D	rt	
af0346	Statistics weight 16	D	rt	
af0347	Statistics weight 17	D	rt	
af0348	Statistics weight 18	D	rt	
af0349	Statistics weight 19	D	rt	
af0350	Statistics weight 20	D	rt	
af0351	Statistics weight 21	D	rt	
af0352	Statistics weight 22	D	rt	
af0353	Statistics weight 23	D	rt	
af0354	Statistics weight 24	D	rt	
af0355	Statistics weight 25	D	rt	
af0356	Statistics weight 26	D	rt	
af0357	Statistics weight 27	D	rt	
af0358	Statistics weight 28	D	rt	
af0359	Statistics weight 29	D	rt	
af0360	Statistics weight 30	D	rt	
af0361	Statistics weight 31	D	rt	
af0362	Statistics weight 32	D	rt	
af0363	Statistics weight 33	D	rt	
af0364	Statistics weight 34	D	rt	
af0365	Statistics weight 35	D	rt	
af0366	Statistics weight 36	D	rt	
af0367	Statistics weight 37	D	rt	
af0368	Statistics weight 38	D	rt	
af0369	Statistics weight 39	D	rt	
af0370	Statistics weight 40	D	rt	
af0371	Statistics weight 41	D	rt	
af0372	Statistics weight 42	D	rt	
af0373	Statistics weight 43	D	rt	
af0374	Statistics weight 44	D	rt	
af0375	Statistics weight 45	D	rt	

af0376	Statistics weight 46	D	rt	
af0377	Statistics weight 47	D	rt	
af0378	Statistics weight 48	D	rt	
af0379	Statistics weight 49	D	rt	
af0380	Statistics weight 50	D	rt	
af0381	Statistics total weight	D	rt	
af0382	Statistics max weight	D	rt	
af0383	Statistics min weight	D	rt	
af0384	Statistics median value	D	rt	
af0385	Statistics average weight	D	rt	
af0386	Statistics standard deviation	D	rt	
af0387	Statistics min cycle time	D	rt	
af0388	Statistics max cycle time	D	rt	
af0389	Statistics average cycle time	D	rt	
af0390	Statistics total cycle time	D	rt	
af0391	Statistics cycle start time secs	D	rt	
af0392	Actual weight	D	rt	
af0394	Final gross weight	D	rt	
af0395	Actual Total Weight of the Active Recipe in Statistics Unit	D	rt	
af0425	Error Sum	D	rt	
af0426	Material Error	D	rt	
af0427	Target	D	rt	
af0428	Fine	D	rt	
af0429	Spill	D	rt	
af0430	Actual weight	D	rt	
af0431	Active Tare Value	D	rt	
af0432	Active Tare Low Limit	D	rt	
af0433	Active Tare High Limit	D	rt	
af0434	(+) tolerance value	D	rt	
af0435	(-) tolerance value	D	rt	
af0436	(+) tolerance percent	D	rt	
af0437	(-) tolerance percent	D	rt	
af0438	Statistics total weight	D	rt	
af0439	Statistics max weight	D	rt	
af0440	Statistics min weight	D	rt	
af0441	Statistics median value	D	rt	
af0442	Statistics standard deviation	D	rt	
af0443	Statistics min cycle time	D	rt	

af0444	Statistics max cycle time	D	rt	
af0445	Statistics average cycle time	D	rt	
af0446	Statistics total cycle time	D	rt	
af0447	Total cycle weight in Statistics Weight Unit	D	rt	
af0448	Statistics weight 1	D	rt	
af0449	Statistics weight 2	D	rt	
af0450	Statistics weight 3	D	rt	
af0451	Statistics weight 4	D	rt	
af0452	Statistics weight 5	D	rt	
af0453	Statistics weight 6	D	rt	
af0454	Statistics weight 7	D	rt	
af0455	Statistics weight 8	D	rt	
af0456	Statistics weight 9	D	rt	
af0457	Statistics weight 10	D	rt	
af0458	Statistics weight 11	D	rt	
af0459	Statistics weight 12	D	rt	
af0460	Statistics weight 13	D	rt	
af0461	Statistics weight 14	D	rt	
af0462	Statistics weight 15	D	rt	
af0463	Statistics weight 16	D	rt	
af0464	Statistics weight 17	D	rt	
af0465	Statistics weight 18	D	rt	
af0466	Statistics weight 19	D	rt	
af0467	Statistics weight 20	D	rt	
af0468	Statistics weight 21	D	rt	
af0469	Statistics weight 22	D	rt	
af0470	Statistics weight 23	D	rt	
af0471	Statistics weight 24	D	rt	
af0472	Statistics weight 25	D	rt	
af0473	Statistics weight 26	D	rt	
af0474	Statistics weight 27	D	rt	
af0475	Statistics weight 28	D	rt	
af0476	Statistics weight 29	D	rt	
af0477	Statistics weight 30	D	rt	
af0478	Statistics weight 31	D	rt	
af0479	Statistics weight 32	D	rt	
af0480	Statistics weight 33	D	rt	
af0481	Statistics weight 34	D	rt	

af0482	Statistics weight 35	D	rt	
af0483	Statistics weight 36	D	rt	
af0484	Statistics weight 37	D	rt	
af0485	Statistics weight 38	D	rt	
af0486	Statistics weight 39	D	rt	
af0487	Statistics weight 40	D	rt	
af0488	Statistics weight 41	D	rt	
af0489	Statistics weight 42	D	rt	
af0490	Statistics weight 43	D	rt	
af0491	Statistics weight 44	D	rt	
af0492	Statistics weight 45	D	rt	
af0493	Statistics weight 46	D	rt	
af0494	Statistics weight 47	D	rt	
af0495	Statistics weight 48	D	rt	
af0496	Statistics weight 49	D	rt	
af0497	Statistics weight 50	D	rt	
af0498	Statistics average weight	D	rt	
af0499	total cycle weight in cycle Unit	D	rt	

10.1.4. Application Integer Process Data (AP)

Access:	"Maintenance" Level Access.		
Class Code:	0x7D	Data Type:	PP
Instances:	1		

10.1.4.1. Attributes

ap0203	Feed cycle	US	rt	
ap0204	Feeding material	US	rt	
ap0209	Fill sequence state	US	rt	
ap0231	Active Tare Unit	US	rt	
ap0236	Unit	US	rt	
ap0240	Partial dose state	US	rt	
ap0243	Statistics Weight Actual used Number	US	rt	
ap0244	Statistics next index	US	rt	
ap0245	Statistics cycle count	US	rt	
ap0246	Statistics cycle count OT accepted	US	rt	
ap0247	Statistics cycle count OT	US	rt	
ap0248	Statistics cycle count aborted	US	rt	
ap0249	Statistics cycle start date days	US	rt	
ap0250	Statistics cycle count Auto continued	US	rt	
ap0251	Next Cycle Value (obsolete)	US	rt	

ap0252	Cycles Remaining	US	rt	
ap0253	Cycle "X" of ax0131 (# of Cycles)	US	rt	
ap0254	Fill WTIN run	US	rt	
ap0256	Recipe ID	US	rt	
ap0257	Formula Rescaled	US	rt	
ap0258	Active Material ID	US	rt	
ap0259	Active Target ID	US	rt	
ap0260	Active Tare ID	US	rt	
ap0261	Active Material Path ID	US	rt	
ap0262	Target Tolerance Type	US	rt	
ap0319	Material Path Number of Feeds	US	rt	
ap0320	Material Path Feed type	US	rt	
ap0321	Totalization Typeof Active Target Material	US	rt	
ap0322	Active Material ID	US	rt	
ap0323	Feed cycle	US	rt	
ap0324	Cycle "X" of ax0131 (# of Cycles)	US	rt	
ap0325	Active Target ID	US	rt	
ap0326	Totalization Typeof Active Target Material	US	rt	
ap0327	Target Tolerance Type	US	rt	
ap0328	Unit	US	rt	
ap0329	Active Tare ID	US	rt	
ap0330	Active Tare Unit	US	rt	
ap0331	Active Material Path ID	US	rt	
ap0332	Material Path Number of Feeds	US	rt	
ap0333	Material Path Feed type	US	rt	
ap0334	Cycles Remaining	US	rt	
ap0335	Next Cycle Value (obsolete)	US	rt	
ap0336	Statistics cycle count	US	rt	
ap0337	Statistics cycle count OT accepted	US	rt	
ap0338	Statistics cycle count OT	US	rt	
ap0339	Statistics cycle count aborted	US	rt	
ap0340	Statistics next index	US	rt	
ap0341	Statistics Weight Actual used Number	US	rt	
ap0342	Statistics cycle start date days	US	rt	
ap0343	Statistics cycle start time secs	US	rt	
ap0344	Fill sequence state	US	rt	
ap0345	Fill WTIN run	US	rt	
ap0346	Auto spill adjustment (not used)	US	rt	
ap0347	Statistics cycle count Auto continued	US	rt	

10.1.5. Application String Process Data (AR)

Access:	"All Users" Access		
Class Code:	0x7F	Data Type:	PP
Instances:	1		

10.1.5.1. Attributes

ar0201	M1 Material Description	S101	rt	
ar0202	M2 Material Description	S101	rt	
ar0203	M3 Material Description	S101	rt	
ar0204	M4 Material Description	S101	rt	
ar0205	Active Tare Description	S101	rt	
ar0206	Target Description	S101	rt	
ar0208	Material Path Name	S101	rt	
ar0209	Cycles unit string	S101	rt	Used in Cycle triggered Demand Print
ar0210	Start time	S101	rt	
ar0211	Start Date	S101	rt	
ar0212	Out of tolerance flag	S101	rt	
ar0235	Target Description	S101	rt	
ar0236	Out of tolerance flag	S101	rt	
ar0237	Active Tare Description	S101	rt	
ar0238	Material Path Name	S101	rt	
ar0239	Start time	S101	rt	
ar0240	Start Date	S101	rt	
ar0241	Cycles unit string used in Cycle triggered Demand Print	S101	rt	

10.1.6. Application Message Table (AW)

Access:	"All Users" Access		
Class Code:	0x9C	Data Type:	PS
Instances:	1		

10.1.6.1. Attributes

aw0101 to aw0199	String Setup Fields 1-99	S101	na	

10.1.7. Application Integer Setup (AX)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

10.1.7.1. Attributes

ax0201	Work Mode	US	na	
ax0202	Loop Work Mode	US	na	
ax0204	Zero tolerance check	US	na	
ax0205	Material Number of Blend	US	na	
ax0210	Track cycles	US	na	
ax0211	Cycles unit	US	na	Used in Cycle triggered Demand Print
ax0212	Ok to weigh-in	US	na	
ax0213	Ok to weigh-out	US	na	
ax0214	Mode	US	na	
ax0215	Manual accept	US	na	
ax0216	Overfill adjustment	US	na	
ax0218	Cycles averaged	US	na	
ax0219	Adjustment factor	US	na	
ax0220	Learn mode	US	na	
ax0221	Test point	US	na	
ax0222	Operation	US	na	
ax0224	Container tare	US	na	
ax0229	Refill tare enable	US	na	
ax0230	Active cycle	US	na	
ax0231	# of Cycles	US	na	
ax0238	Update table	US	na	
ax0239	Update table	US	na	
ax0259	Cycle Tare	US	na	
ax0260	Clear Tare	US	na	
ax0261	Material Transition	US	na	
ax0262	Weigh-in Transition	US	na	
ax0263	Weigh-out Clear Tare	US	na	
ax0264	Refill Mode	US	na	
ax0265	Refill Threshold Unit	US	na	Refill Tare use ax0129 instead
ax0266	Material Conservation	US	na	
ax0267	Weigh-out Transition	US	na	
ax0268	Feed Alarm Initial Feed timeout	US	na	
ax0269	Feed Alarm Dump Timeout	US	na	
ax0270	Feed Alarm Refill Timeout	US	na	
ax0271	Statistics Weight Unit	US	na	
ax0272	Action Log Enable	US	na	
ax0273	Transaction Log Enable	US	na	

ax0274	Maximum cycle time.	US	na	Expected amount of time a container should take to fill
ax0275	Statistics enable	US	na	
ax0276	Statistics trigger(obsolete)	US	na	
ax0281	Report Description	US	na	DOC00000153_IND500x_SRS_Reports
ax0282	Report n	US	na	DOC00000153_IND500x_SRS_Reports
ax0283	Report Total	US	na	DOC00000153_IND500x_SRS_Reports
ax0284	Feed Alarm timeout for the process	US	na	
ax0285	Feed Alarm Weight Unit	US	na	
ax0286	the unit of Zero Tolerance Value	US	na	
ax0287	the unit of Heel weight Value.	US	na	
ax0288	the unit of Auxiliary Output Trigger On Weight and Off Weight	US	na	
ax0289	Work Mode	US	na	
ax0290	Predispensing	US	na	
ax0291	Predispensing time	US	na	
ax0292	Predispensing Weight Unit	US	na	
ax0293	Pulse time (On)	US	na	
ax0294	Max. Lance Time	US	na	
ax0295	Drip Pan Control	US	na	
ax0296	Loop Work Mode	US	na	
ax0297	Cycle tare before Fill	US	na	
ax0298	Clear Tare After Fill	US	na	
ax0299	Fill Transition	US	na	
ax0301	Track cycles	US	na	
ax0302	# of Cycles	US	na	
ax0303	Container tare	US	na	
ax0304	Ok to weigh-in	US	na	
ax0305	Mode	US	na	
ax0306	Feed Alarm Initial Feed timeout	US	na	
ax0307	Feed Alarm timeout for the process	US	na	
ax0308	Feed Alarm Weight Unit	US	na	
ax0309	Manual accept	US	na	
ax0310	Zero tolerance check	US	na	
ax0311	the unit of Zero Tolerance Value	US	na	
ax0312	Statistics enable	US	na	
ax0313	Statistics trigger(obsolete)	US	na	
ax0314	Overfill adjustment	US	na	
ax0315	Cycles averaged	US	na	
ax0316	Adjustment factor	US	na	

ax0317	Update table	US	na	
ax0318	Learn mode	US	na	
ax0319	Test point	US	na	
ax0320	Update table	US	na	
ax0321	Operation	US	na	
ax0322	Active cycle	US	na	
ax0323	the unit of Auxiliary Output Trigger On Weight and Off Weight	US	na	
ax0324	Statistics Weight Unit	US	na	
ax0325	Action Log Enable	US	na	
ax0326	Transaction Log Enable	US	na	
ax0328	Cycles unit used in Cycle triggered Demand Print	US	na	

10.1.8. Application Floating Point Setup (AY)

Access:	"Maintenance" Level Access.		
Class Code:		Data Type:	PS
Instances:	1		

10.1.8.1. Attributes

ay0202	Zero tolerance value	D	na	
ay0203	Start delay	D	na	
ay0205	After weight delay	D	na	
ay0206	After empty delay	D	na	
ay0207	Wgh-in compl delay	D	na	
ay0208	Wgh-out compl delay	D	na	
ay0216	Pulse time (on)	D	na	
ay0217	Pause time (off)	D	na	
ay0218	Trigger weight (on)	D	na	
ay0219	Time (off)	D	na	
ay0220	Weight limit (off)	D	na	
ay0221	Timing	D	na	
ay0222	Inhibited Time	D	na	
ay0223	Refill Low Threshold	D	na	
ay0224	Refill High Threshold	D	na	
ay0225	Initial Feed Weight changed	D	na	
ay0226	Dump Weight changed	D	na	
ay0227	Refill Weight changed	D	na	
ay0228	Misalignment Weight	D	na	
ay0229	Raise Lance Delay	D	na	

ay0230	Predispensing Weight	D	na	
ay0231	Weight Change	D	na	
ay0232	Start delay	D	na	
ay0233	Inhibited Time	D	na	
ay0234	After weight delay	D	na	
ay0236	Wgh-in compl delay	D	na	
ay0237	Pulse time (on)	D	na	
ay0238	Pause time (off)	D	na	
ay0239	Initial Feed Weight changed	D	na	
ay0240	Zero tolerance value	D	na	
ay0241	Timing	D	na	
ay0242	Trigger weight (on)	D	na	
ay0243	Weight limit (off)	D	na	
ay0244	Time (off)	D	na	

10.1.9. Custom Trigger Commands & Statuses (CP)

Access:	"All Users" Access		
Class Code:	0x94	Data Type:	D
Instances:	1		

10.1.9.1. Attributes

cp0104	Blend/Fill Print Trigger	BI	rc	Is set to 1 when the trigger initiates.
cp0105	Dump Print Trigger	BI	rc	Is set to 1 when the trigger initiates.
cp0106	Dose Print Trigger	BI	rc	Is set to 1 when the trigger initiates.
cp0107	Cycle Print Trigger	BI	rc	Is set to 1 when the trigger initiates.
cp0114	Blend/Fill Trigger Status			Is set to 1 when the trigger initiates.
cp0115	Dump Trigger Status			Is set to 1 when the trigger initiates.
cp0116	Dose Trigger Status			Is set to 1 when the trigger initiates.
cp0117	Cycle Trigger Status			Is set to 1 when the trigger initiates.

10.1.10. Dynamic Scale Weight (WT)

Access:	"Read Only" Access.		
Class Code:	0x68	Data Type:	D
Instances:	1	Instance 1 = Scale platforms 1	

10.1.10.1. Attributes

wt0101	Displayed Gross Weight	S13	rt	Rounded Gross Weight shown in selected increment size.
wt0102	Displayed Net Weight	S13	rt	Rounded Net Weight shown in selected increment size.
wt0103	Weight Units	S4	rt	lb pounds, kg kilograms, grams, oz ounces, oztroy, dwt pennyweights, metric tons, ton, or custom units name

10.1.11. Scale Process Data (WS)

Access:	"Read Only" Access.		
Class Code:	0x66	Data Type:	PP
Instances:	1		

10.1.11.1. Attributes

ws0110	Displayed Tare Weight	S13	na	Rounded Tare Weight shown in selected increment size.

10.1.12. Scale Calibration (CE)

Access:	"Administrator" Level Access, customizable by individual field		
Class Code:	0x72	Data Type:	PC
Instances:	1		

10.1.12.1. Attributes

Multi-Range Parameters

ce0103	Primary Units	By	na	0=none 1=pounds 2=kilograms	3=grams 4=metric tons 5=tons

10.1.13. Full Target Process Data (SP)

Access:	"Supervisor" Level Access. sp0104 and sp0106 are Service level.		
Class Code:	0x69	Data Type:	PP
Instances:	1		

10.1.13.1. Attributes

sp0101	Material Description	S21	na	Text name describing the Material
sp0105	Target Coincidence Value	D	rt	Weight value without units.
sp0109	Spill Weight Value	D	rt	This is a cutoff Spill Value for a weight Target When this field is set, the Target turns off the feed or fine feed when: Weight = (sp0105) – (sp0109).
sp0110	Fine Feed Weight Value	D	rt	For two-speed feeds, this field is a Fine Feed (slower feed) value. When this field is set, the Target turns off the Fast Feed when: Weight = (sp0105) – (sp0109) – (s0110)
sp0111	Upper Tolerance Value	D	rt	The Target uses this field to determine if the ACTUAL cutoff weight falls within this specified upper tolerance. This is the last OK weight when transitioning from "in tolerance" to "over tolerance". Value is in absolute weight or deviation from Target depending on sp0113.

sp0112	Lower Tolerance Value	D	rt	The Target uses this field to determine if the actual cutoff weight falls within this specified lower tolerance. This is the first OK weight when transitioning from "under tolerance" to "in tolerance". Value is in absolute weight or deviation from target depending on sp0113.
sp0114	Upper Tolerance Percent	D	na	If sp0113 = 2, the Target uses this field to calculate the upper tolerance value as a percent of the coincidence value.
sp0115	Lower Tolerance Percent	D	na	If sp0113 = 2, the Target uses this field to calculate the lower tolerance value as a percent of the coincidence value.
sp0120	Target Weight Units	By	na	0 = none 1 = pounds 2 = kilograms [default] 3 = grams 4 = metric tons 5 = tons 9 = ounces 10 = custom unit

10.1.14. System State (XD)

Access:	"Read Only" Access.		
Class Code:	0x65	Data Type:	D
Instances:	1		

10.1.14.1. Attributes

xd0103	Current Date	S12	na	Format defined in xs0110
xd0104	Time of Day	S12	na	Format defined in xs0111

11 Revision History

Document Revision	Firmware Version	Date	Changes
A	1.xx	12/2022	[Initial release]
B	1.xx	09/2023	[Revision]
C	1.xx	01/2024	[Revision]

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