Application Note

Weight Data Serial/Weight Data Ethernet

XE & XS Controls

The METTLER TOLEDO HI-SPEED X-Series option Weight Data provides a real time interface from the X-series control showing net package weight and other select information for each package crossing the weigh conveyor. Available in serial format or via Ethernet TCP/IP, weight data will send continuous weight information to an end users connected device such as a PC or other data collection system.

How Is Weight Data Used?

Weight Data can be used in many ways. It is primarily a tool for evaluating and optimizing production line performance. Whether used in conjunction with customer developed data collection and mining applications or an off the shelf software solution, information from every package crossing the weigh conveyor can be viewed, evaluated, or saved for further processing. Blocks of production data can be used to make decisions, satisfy regulatory requirements or as input for measurement of production line OEE (Overall Equipment Effectiveness).

What Is Provided With The Weight Data Option

There are two different methods for transmitting Weight Data from the control and they are dependent upon the medium the end user prefers or selects or receive the data. The hardware required and control configurations differ for each. Regardless of the type of Weight Data Interface selected the end user is responsible for providing a dedicated serial or Ethernet TCP/IP connection between the X-series checkweigher and their PC and the means to make the data visible on their device, there is no PC based software program included with this option. If one is required CW-ReAcT II is an ideal choice providing a ready to use PC based program to accept the weight data from one or more checkweighers.

Weight Data Interface – Serial

When a Serial Weight Data Interface is required a serial interface card, unique to the type of interface (RS232, RS422), is provided. This card is inserted into the appropriate slot in the X-series Real Time Controller (XRTC) located in the control housing of the checkweigher. The serial interface card contains the drivers and firmware required to transmit weight data from the checkweigher control.

The communications area of the XRTC contains 2 serial communication ports, therefore it is possible though unlikely, to have 2 serial communication ports simultaneously sending weight data to a custom device. The physical hardware present at these ports is a standard male D-Sub 9 pin connector. The exit point for serial communication from the enclosure is at the gland plate. The location of the gland plate varies by enclosure. A hole for the serial cable is added to the gland plate and a cord grip is provided. Since there is tremendous variance in the end user requirements for receiving Weight Data from the control, HI-SPEED does not provide serial cable or D-Sub 9 pin connectors. A wiring diagram for

Serial Interface Card

XRTC 2 Serial
Communication Ports

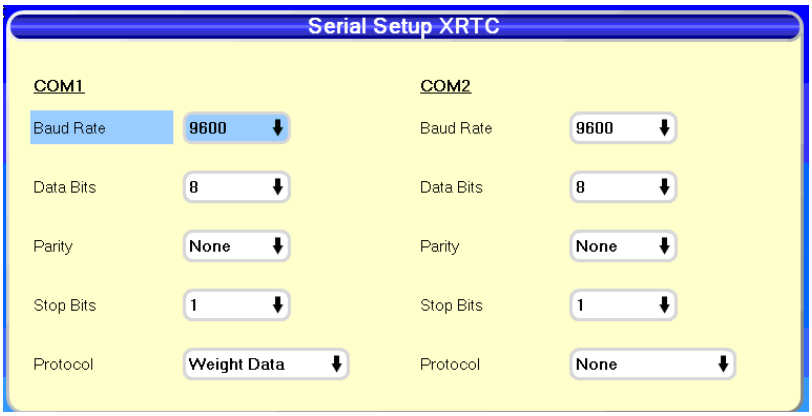
METTLER TOLEDO

the serial interface is provided which permits the end user to build the serial cable to suit their exact needs.

For Weight Data Serial the end user must provide a dedicated serial connection between the checkweigher and PC. The end user is responsible for the creation and maintenance of the connection as well as the programming required to make the transmitted data visible. This option from HI-SPEED includes the Weight Data Interface feature with additional hardware required for a serial connection of the selected interface type.

Prior to leaving the factory the X-series control must be configured for transmission of weight data. Unless otherwise specified, each X-series control will ship with the factory default communication port settings and ASCII transmission format. The weight data communication is tested and verified prior to checkout. The factory default communication port settings are:

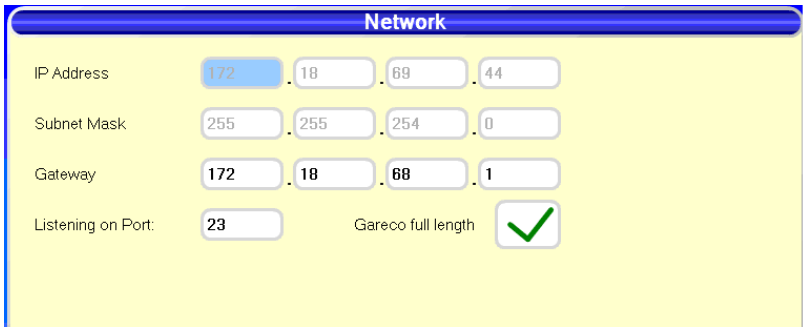
- Baud Rate: 9600
- Data Bits: 8
- Parity: None
- Stop Bits: 1
- Protocol: Weight Data



Weight Data Interface – Ethernet

If Weight Data Interface, Ethernet is selected the physical layer communication area of the XRTC is a standard RJ45 Ethernet connector. The Ethernet protocol is TCP/IP and the connection type is a high capacity 10/100 Base T connection. The exit point on the control for Weight Data Ethernet is a standard RJ45 bulkhead connector located on the side of the control enclosure.

As with a serial connection, for Ethernet the end user must provide an Ethernet network and two (2) static IP addresses for the checkweigher. The end user is responsible for the creation and maintenance of the network as well as the programming required to make the transmitted data visible, there is no PC based software program included with this option. If one is required CW-ReAcT II is an ideal choice providing a ready to use PC based program to accept the weight data from one or more checkweighers. This option from HI-SPEED Includes the Weight Data Interface feature with additional hardware required for an Ethernet (TCP/IP) bulkhead connection.



Weight Data Output Forms And Formats

Regardless of the form of Weight Data selected, HI-SPEED X-series controls transmit Weight Data in simple common ASCII format. ASCII is an acronym for American Standard Code for Information Interchange. It represents a coding standard that can be used for interchanging information, if the information is expressed mainly by the written form of English words. It is implemented as a character-encoding scheme based on the ordering of the English alphabet. ASCII codes represent text in computers, communications equipment, and other devices that work with text. For more information there are a wide variety of sources available including wikipedia and the American National Standards Institute (ANSI) at www.ansi.org

Weight Data is provided in a simple ASCII character string.

The default ASCII Format Is Format 3: (CR)(LF) with package name;

Example: COFFEE¬¬¬¬¬¬¬¬1.2g¬¬(CR)(LF).

HI-SPEED has 12 standard output formats for weigh data. Custom formats have also been created to accommodate special needs and requirements of end users. Special Weight Data output formats are available at additional cost from HI-SPEED. Following is a list of the 12 standard Weight Data formats:

Output Formats Of Weight Data

For standard formats 1-8 or special formats 2000, 2001, 2053, or 2076 selected in the interface configuration the string is designed as follows:

Format 1: (STX)...(ETX) With Package Name

- The string consists of 22 characters.

Start	Package name	Weight	Unit	End
(STX)	XXXXXXXXXX	XXXXXXX	XXX	(ETX)

Field	Description
Start (STX)	1 character: (Hex)02
Package name	10 characters, left justified
Weight	7 characters, number of the decimal place according to the configuration (0, 1, 2 or 3), no decimal point with 0 decimal places, right justified with leading blanks
Unit	3 characters, left justified (g/kg/oz/lb)
End (ETX)	1 character, (Hex)03

Example: (STX)COFFEE¬¬¬¬¬500.00g¬¬(ETX)

Format 2: (STX)...(ETX) Without Package Name

- The string consists of 12 characters.

Start	Weight	Unit	End
(STX)	XXXXXXX	XXX	(ETX)

Field	Description
Start (STX)	1 character: (Hex)02
Weight	7 characters, number of the decimal place according to the configuration (0, 1, 2 or 3), no decimal point with 0 decimal places, right justified with leading blanks
Unit	3 characters, left justified (g/kg/oz/lb)
End (ETX)	1 character, (Hex)03

Example: (STX)¬¬0.512kg¬(ETX)

Format 3: (CR)(LF) With Package Name (Factory Setting)

- The string consists of 22 characters.

Package name	Weight	Unit	End
XXXXXXXXXX	XXXXXXX	XXX	(CR)(LF)

Field	Description
Package name	10 characters, left justified
Weight	7 characters, number of the decimal place according to the configuration (0, 1, 2 or 3), no decimal point with 0 decimal places, right justified with leading blanks
Unit	3 characters, left justified (g/kg/oz/lb)
End (CR)(LF)	2 characters, (Hex)0D, 0A

Example: COFFEE¬¬¬¬¬¬¬¬¬1.2g¬¬(CR)(LF)

Format 4: (CR)(LF) Without Package Name

- The string consists of 12 characters.

Weight	Unit	End
XXXXXXX	XXX	(CR)(LF)

Field	Description
Weight	7 characters, number of the decimal place according to the configuration (0, 1, 2 or 3), no decimal point with 0 decimal places, right justified with leading blanks
Unit	3 characters, left justified (g/kg/oz/lb)
End (CR)(LF)	2 characters, (Hex)0D, 0A

Example: ¬¬¬¬¬50g¬¬(CR)(LF)

i Note: Data output formats 5-8 include the weight zone. The zone is characterized as follows:

OK	is the zone of "accepted" (i.e. "good") products)
–	is the first (inner) zone of underweights
+	is the first (inner) zone of overweights
—	with five zones: second (outer) zone of underweights
++	with five zones: second (outer) zone of overweights

Format 5: (STX)...(ETX) With Package Name And Classification

- The string consists of 24 characters.

Start	Package name	Weight	Unit	Zone	End
(STX)	XXXXXXXXXX	XXXXXXX	XXX	XX	(ETX)

Field	Description
Start (STX)	1 character: (Hex)02
Package name	10 characters, left justified
Weight	7 characters, number of the decimal place according to the configuration (0, 1, 2 or 3), no decimal point with 0 decimal places, right justified with leading blanks
Unit	3 characters, left justified (g/kg/oz/lb)
Zone	2 characters, right justified with leading blanks (OK, –, +, —, ++)
End (ETX)	1 character, (Hex)03

Example: (STX)COFFEE¬¬¬¬¬500.00g¬¬OK(ETX)

Format 6: (STX)..(ETX) Without Package Name And Classification

- The string consists of 14 characters..

Start	Weight	Unit	Zone	End
(STX)	XXXXXXX	XXX	XX	(ETX)

Field	Description
Start (STX)	1 character: (Hex)02
Weight	7 characters, number of the decimal place according to the configuration (0, 1, 2 or 3), no decimal point with 0 decimal places, right justified with leading blanks
Unit	3 characters, left justified (g/kg/oz/lb)
Zone	2 characters, right justified with leading blanks (OK, –, +, —, ++)
End (ETX)	1 character, (Hex)03

Example: (STX)¬¬0.512g¬¬¬+(ETX)

Format 7: (CR)(LF) With Package Name And Classification

- The string consists of 24 characters..

Package name	Weight	Unit	Zone	End
XXXXXXXXXX	XXXXXXX	XXX	XX	(CR)(LF)

Field	Description
Package name	10 characters, left justified
Weight	7 characters, number of the decimal place according to the configuration (0, 1, 2 or 3), no decimal point with 0 decimal places, right justified with leading blanks
Unit	3 characters, left justified (g/kg/oz/lb)
Zone	2 characters, right justified with leading blanks (OK, –, +, —, ++)
End (CR)(LF)	2 characters, (Hex)0D, 0A

Example: COFFEE¬¬¬¬¬¬¬¬¬1.2g¬¬—(CR)(LF)

Format 8: (CR)(LF) Without Package Name And Classification

- The string consists of 14 characters..

Weight	Unit	Zone	End
XXXXXXX	XXX	XX	(CR)(LF)

Field	Description
Start (STX)	1 character: (Hex)02
Weight	7 characters, number of the decimal place according to the configuration (0, 1, 2 or 3), no decimal point with 0 decimal places, right justified with leading blanks
Unit	3 characters, left justified (g/kg/oz/lb)
Zone	2 characters, right justified with leading blanks (OK, –, +, —, ++)
End (CR)(LF)	2 characters, (Hex)0D, 0A

Example: ¬¬¬¬¬50g¬¬¬+(CR)(LF)

Format 2000: (CR)(LF) Weights Only

- The string consists of 9 characters..

Weight	End
XXXXXXX	(CR)(LF)

Field	Description
Weight	7 characters: number of the decimal place according to the configuration (0, 1, 2 or 3), no decimal point with 0 decimal places, right justified with leading blanks
End (CR)(LF)	2 characters: (Hex)0D, 0A

Example: ¬¬¬49.2(CR)(LF)

Format 2001: (CR)(LF) Weights Only (With Leading Zeros)

- The string consists of 9 characters..

Weight	End
XXXXXXX	(CR)(LF)

Field	Description
Weight	7 characters: number of the decimal place according to the configuration (0, 1, 2 or 3), no decimal point with 0 decimal places, right justified with leading blanks
End (CR)(LF)	2 characters: (Hex)0D, 0A

Example: 00049.2(CR)(LF)

Format 2053: (STX)... (CR)(LF)(ETX) Weights Only

- The string consists of 12 characters..

Start	Leading Char	Weight	End
(STX)	Space	XXXXXXX	(CR)(LF)(ETX)

Field	Description
Start	1 character: (Hex)02
Leading Char	1 character: (Hex)20
Weight	7 characters: number of the decimal place according to the configuration (0, 1, 2 or 3), no decimal point with 0 decimal places, right justified with leading blanks
End (CR)(LF)(ETX)	3 characters: (Hex)0D, 0A, 03

Example: (STX)¬¬¬¬49.2(CR)(LF)(ETX)

Format 2076: (STX)... (ETX) Weights With Backslash

- The string consists of 10 characters..

Start	Leading Char	Weight	End
(STX)	/	XXXXXXX	(ETX)

Field	Description
Start	1 character: (Hex)02
Leading Char	1 character: /
Weight	7 characters: number of the decimal place according to the configuration (0, 1, 2 or 3), no decimal point with 0 decimal places, right justified with leading blanks
End (ETX)	1 character: (Hex)03

Example: (STX)/¬¬¬49.2(ETX)

Data Output Formats for Multi-Lane Checkweighers

In the case of Multi-Lane checkweighers (checkweigher with more than one weigh conveyor that are weighing one common package the number of the production line is included as "line No." (1 or 2 or ...) in the data string to ensure clear allocation of the weight values to the production line they originate from. Thus the string becomes 1 character longer. The data string for all formats contains this extra "lane" indicator character. See below for example.

Format 1: (STX)...(ETX) With No. And Package Name

- The string consists of 23 characters..

Start	Line	Package name	Weight	Unit	End
(STX)	X	XXXXXXXXXX	XXXXXXX	XXX	(ETX)