Measurement · Weighing · Control

G6 Multi Channel Crane Weighing Instrument

Program version 4.1.x

EtherNet/IP Program Option Technical Manual Supplement

PM/RM types

BLH NOBEL
A VPG Brand

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1 Introduction

This manual is a supplement to the Technical Manual of the G6 Multi Channel Crane Weighing Instrument. It covers the EtherNet/IP communication option.

For any information besides EtherNet/IP please refer to the Technical Manual.

To be able to use the EtherNet/IP option an option code must be purchased and entered in the Program Options menu. Contact your supplier for more information. Note that the option code is valid only for the specific G6-CPU S/N it was purchased for.

This manual is aimed at the practical use of the EtherNet/IP interface of the G6 Instrument and the information needed during commissioning of the communication is placed first.

The EtherNet/IP is intended for process data (weight, status etc.). Configuration of the instrument is done via the front panel or by using a browser connected to the instrument.

2 Using the EtherNet/IP interface

The EtherNet/IP interface of the G6 instrument lets the user read and write data to the instrument in a variety of ways making it possible to adapt to the specific requirements of the particular application. This chapter gives some guidance how to use the interface in the best way.

1. Activate the EtherNet/IP option code. Note that it is tied to the G6-CPU S/N. This is the only action needed in the G6 to activate EtherNet/IP. All other setup will be done in the PLC.
2. Setup the IP-address of the instrument and connect it to the network.
3. Install the EDS file for the G6 Crane Instrument in the PLC program development system. The file name is “BLHNobel_G6_C_EIP_V1.1.eds” (article number 200798). Create a G6_Crane Instrument in the PLC project and select the connections necessary in the properties window for the new module. See example below.
4. Choose how many scales (channels) that are used in the instrument. Select one of connection 1 to connection 4. Only one can be chosen. These connections contain both input and output data. See chapter 3, ‘Connections’ for details.
5. Decide if any extra data is needed. Select one or more of connection 5 to connection 17. These connections contain only input data.
   See chapter 3, ‘Connections’ for details.
6. Ready.

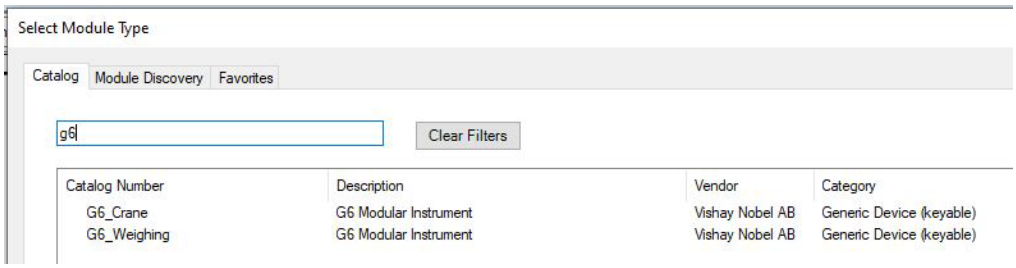
Below are pictures from a PLC program development system when adding and configuring a G6 crane instrument.

The example shows a crane with four channels/scales. Two channels in Main hoist and two scales for auxiliary hoists.

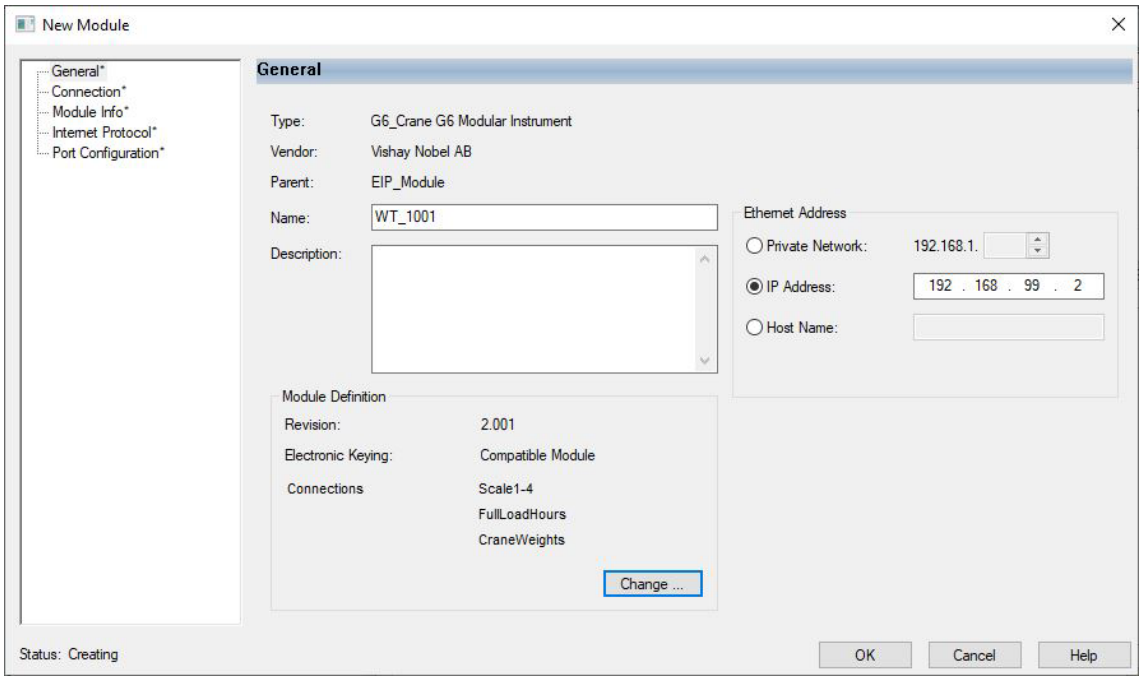
Connections for this Module in PLC:

- Connection 3: Scale 1-4. Is used to get weight data from individual channels in Main hoist and the Auxiliary hoists, and to send commands to the G6 instrument.
- Connection 14: Full Load Hours. Is used to get Full Load Hours in minutes for Main hoist and Auxiliary hoists.
- Connection 17: Crane Weights. Is used to get weight data from Main hoist, Side A, Side B, Side A-Side B, and Sum all Channels.

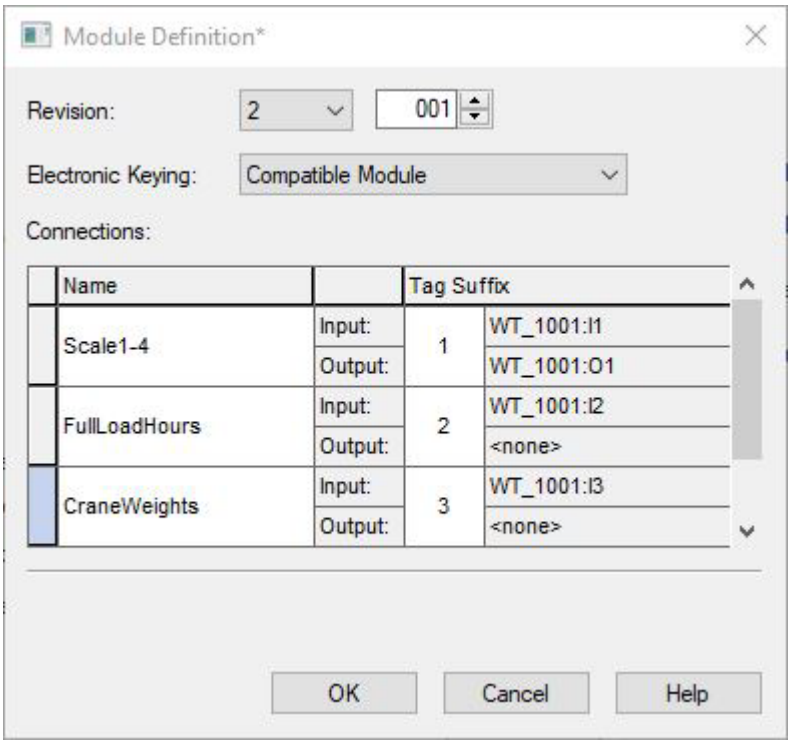
The IP-address of the G6 Instrument is 192.168.99.2 and Module Name is WT_1001.



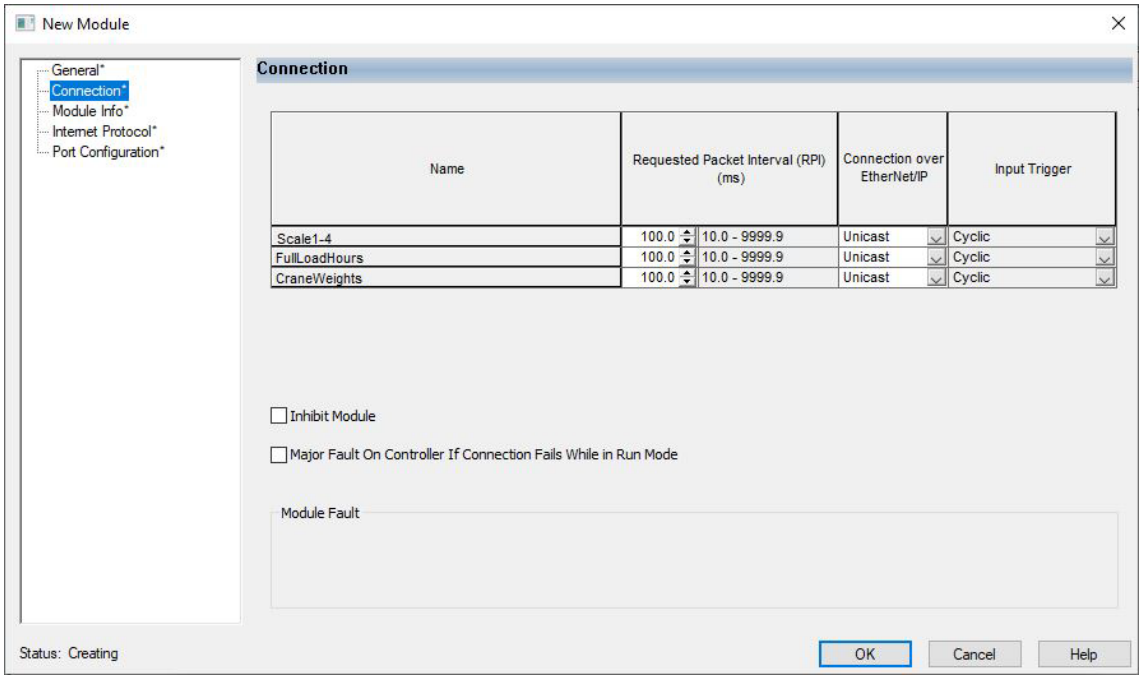
Select Module type window. Select G6_Crane



The New Module dialog window



The Module Definition dialog window



New Module Connection dialog window

Below are the Controller Tags windows shown with tag names in plain text and the data in correct format. Name and data type are received from the EDS-file.

Name	Value	Force M	Style	Data Type
+ WT_1001:I1	{...}	{...}		_049B:G...
− WT_1001:O1	{...}	{...}		_049B:G...
+ WT_1001:O1.Command	0		Decimal	INT
+ WT_1001:O1.ParameterNo	0		Decimal	INT
WT_1001:O1.ParameterValue	0.0		Float	REAL
+ WT_1001:I2	{...}	{...}		_049B:G...
+ WT_1001:I3	{...}	{...}		_049B:G...

Output Controller Tags

Name	Value	Force M	Style	Data Type
− WT_1001:I1	{...}	{...}		_049B:G...
WT_1001:I1.ConnectionFaulted	0		Decimal	BOOL
+ WT_1001:I1.InstrumentError	0		Decimal	INT
+ WT_1001:I1.InstrumentStatus	10		Decimal	SINT
+ WT_1001:I1.InstrumentState	3		Decimal	SINT
+ WT_1001:I1.CommandAck	0		Decimal	INT
+ WT_1001:I1.CommandError	0		Decimal	INT
+ WT_1001:I1.Levels1to16Status	0		Decimal	INT
+ WT_1001:I1.Levels17to32Status	0		Decimal	INT
+ WT_1001:I1.NotUsedData10	0		Decimal	INT
+ WT_1001:I1.NotUsedData11	0		Decimal	INT
+ WT_1001:I1.Scale1ErrorCode	0		Decimal	INT
+ WT_1001:I1.Scale1Status	0		Decimal	INT
WT_1001:I1.Scale1GrossWeight	350.2		Float	REAL
WT_1001:I1.Scale1NetWeight	26.0		Float	REAL
+ WT_1001:I1.Scale2ErrorCode	0		Decimal	INT
+ WT_1001:I1.Scale2Status	0		Decimal	INT
WT_1001:I1.Scale2GrossWeight	150.2		Float	REAL
WT_1001:I1.Scale2NetWeight	24.9		Float	REAL
+ WT_1001:I1.Scale3ErrorCode	0		Decimal	INT
+ WT_1001:I1.Scale3Status	32		Decimal	INT
WT_1001:I1.Scale3GrossWeight	100.200005		Float	REAL
WT_1001:I1.Scale3NetWeight	0.0		Float	REAL
+ WT_1001:I1.Scale4ErrorCode	0		Decimal	INT
+ WT_1001:I1.Scale4Status	0		Decimal	INT
WT_1001:I1.Scale4GrossWeight	200.2		Float	REAL
WT_1001:I1.Scale4NetWeight	-20.0		Float	REAL

Input Controller Tags Scale 1-4

Name	Value	Force M	Style	Data Type
WT_1001:I1	{...}	{...}		_049B:G...
WT_1001:O1	{...}	{...}		_049B:G...
WT_1001:I2	{...}	{...}		_049B:G...
WT_1001:I2.ConnectionFaulted	0		Decimal	BOOL
WT_1001:I2.FullLoadHoursMainHoist	62.0		Float	REAL
WT_1001:I2.FullLoadHoursCh1	0.0		Float	REAL
WT_1001:I2.FullLoadHoursCh2	0.0		Float	REAL
WT_1001:I2.FullLoadHoursCh3	0.0		Float	REAL
WT_1001:I2.FullLoadHoursCh4	0.0		Float	REAL
WT_1001:I2.FullLoadHoursCh5	0.0		Float	REAL
WT_1001:I2.FullLoadHoursCh6	0.0		Float	REAL
WT_1001:I2.FullLoadHoursCh7	0.0		Float	REAL
WT_1001:I2.FullLoadHoursCh8	0.0		Float	REAL
WT_1001:I2.RopeWeight	0.0		Float	REAL
WT_1001:I2.RopeCount	0.0		Float	REAL

Input Controller Tags Full Load Hours

Name	Value	Force M	Style	Data Type
WT_1001:I1	{...}	{...}		_049B:G...
WT_1001:O1	{...}	{...}		_049B:G...
WT_1001:I2	{...}	{...}		_049B:G...
WT_1001:I3	{...}	{...}		_049B:G...
WT_1001:I3.ConnectionFaulted	0		Decimal	BOOL
WT_1001:I3.MainHoistErrorCode	0		Decimal	INT
WT_1001:I3.MainHoistStatus	0		Decimal	INT
WT_1001:I3.MainHoistGrossWeight	500.5		Float	REAL
WT_1001:I3.MainHoistNetWeight	50.9		Float	REAL
WT_1001:I3.SideA_ErrorCode	0		Decimal	INT
WT_1001:I3.SideA_Status	0		Decimal	INT
WT_1001:I3.SideA_GrossWeight	350.2		Float	REAL
WT_1001:I3.SideA_NetWeight	26.0		Float	REAL
WT_1001:I3.SideB_ErrorCode	0		Decimal	INT
WT_1001:I3.SideB_Status	0		Decimal	INT
WT_1001:I3.SideB_GrossWeight	150.2		Float	REAL
WT_1001:I3.SideB_NetWeight	24.9		Float	REAL
WT_1001:I3.SideA_B_ErrorCode	0		Decimal	INT
WT_1001:I3.SideA_B_Status	0		Decimal	INT
WT_1001:I3.SideA_B_GrossWeight	200.0		Float	REAL
WT_1001:I3.SideA_B_NetWeight	1.1		Float	REAL
WT_1001:I3.SumAllChErrorCode	0		Decimal	INT
WT_1001:I3.SumAllChStatus	0		Decimal	INT
WT_1001:I3.SumAllChGrossWeight	800.9		Float	REAL
WT_1001:I3.SumAllChNetWeight	30.9		Float	REAL
WT_1001:I3.Data_4021	0		Decimal	INT
WT_1001:I3.Data_4022	0		Decimal	INT

Input Controller Tags Crane Weights

3 Connections

3.1 Overview

No.	Input Assembly	Size (bytes)	Output Assembly	Size (bytes)	Name	Default RPI
1	101	40	100	8	Scales 1 - 2.	100
2	102	64	100	8	Scales 1 - 4.	100
3	103	88	100	8	Scales 1 - 6.	100
4	104	112	100	8	Scales 1 - 8.	100
5	105	38	198	0	Analog out, dig I/O status, clock	1000
6	106	32	198	0	Preset Tare values, scales 1 – 8	1000
7	107	128	198	0	Level 1 – 32 values	1000
8	108	64	198	0	Not Used Conn 08	1000
9	109	64	198	0	Not Used Conn 09	1000
10	110	64	198	0	Not Used Conn 10	1000
11	111	64	198	0	Not Used Conn 11	1000
12	112	48	198	0	Not Used Conn 12	100
13	113	48	198	0	Input signal (mV/V) Scale 1-8	100
14	114	80	198	0	Full Load Hours	100
15	115	40	198	0	Not Used Conn 15	100
16	116	80	198	0	Not Used Conn 16	100
17	117	84	198	0	Crane Weights	100

Default RPI (Requested Package Interval) is given in ms.

Connection 1 – 4 and 12 - 17 are possible to set between 10 ms and 20 s.
Connection 5 - 11 are possible to set between 100 ms and 20 s.

Avoid an unnecessary low RPI since it will slow down other functionality in the instrument.

3.2 Connection 1 – 4 Output data

The output data of connections 1 to 4 is the Assembly Instance 100 (Consuming instance). Output data is 8 bytes as described in table below. Least significant byte is always first.

Bytes	Contents	Size
0 – 1	Command	2 byte
2 – 3	Parameter ID	2 byte
4 – 7	Data to write (floating point)	4 bytes

Bytes 0 - 1: The command byte is used when writing data to the instrument and to issue various scale related commands such as taring, zeroing etc.

Note that a new command is detected when the content of the command register is changed. If the same command is used more than once another command e.g. 0 must be used in between.

The response to a given command is the 'Command acknowledge' and the 'Command error' bytes in the input data of the connection.

See the Technical Manual for detailed information on Crane and Scale functions etc.

Bytes 2 - 3: The number of the preset Tare (1 - 8) to set. The data in byte 2 and 3 are disregarded for any other commands than 220.

Bytes 4 to 7: The value of the Preset tare to set in floating point format. The data in bytes 4 to 7 are disregarded for any other commands than 220.

Examples

Tare Main hoist:

Command = 90, Parameter ID = no significance, Data = no significance

Set Preset Tare Scale 7 to 65.4:

Command = 220, Parameter ID = 7, Data = 65.4

Enter remote operation:

Command = 1, Parameter ID = no significance, Data = no significance

Important:

Data must be set when the command is transmitted. Do not set command during one scan cycle and data during next or similar that can give an unintended result.

3.3 Connection 1 – 4 Commands

Scale related Commands

Auto tare	Used to set the net weight to zero or Preset tare value.
Set to zero	Used to set the gross weight to zero.
Select gross mode	Show net weight on the display.
Select net mode	Show gross weight on the display.

Scale Command numbers

Command	Scale 1	Scale 2	Scale 3	Scale 4	Scale 5	Scale 6	Scale 7	Scale 8
Auto tare	10	20	30	40	50	60	70	80
Set to zero	11	21	31	41	51	61	71	81
Select gross mode	12	22	32	42	52	62	72	82
Select net mode	13	23	33	43	53	63	73	83

Miscellaneous Commands:

Cmd	Action activated in instrument	Description
0	No action	
1	Start operation	When the instrument is in ‘Wait for start state’, this command can be used to start up the instrument.
2	Enter Remote operation	This command disables the keys on the instrument. This means that an external computer is controlling the instrument or the instrument is controlled using digital inputs.
3	Exit Remote operation	This command enables the keys and leaves the remote operation.
90	Main Hoist: Auto Tare	Auto tare all channels in the main hoist separately.
210	Start ‘Operating Time 1’	Same as input 11 activated.
211	Stop ‘Operating Time 1’	Same as input 11 deactivated.
212	Start ‘Operating Time 2’	Same as input 12 activated.
213	Stop ‘Operating Time 2’	Same as input 12 deactivated.
214	Start ‘Operating Time 3’	Same as input 13 activated.
215	Stop ‘Operating Time 3’	Same as input 13 deactivated.
216	Start ‘Full Load Hours’ Main hoist	Same as input 14 activated. Note: Command is only working if parameter ‘Input 14 Use’ is set to ‘FLH Calc Ctrl’.

Cmd	Action activated in instrument	Description
217	Stop ‘Full Load Hours’ Main hoist	Same as input 14 deactivated. Note: Command is only working if parameter ‘Input 14 Use’ is set to ‘FLH Calc Ctrl’.
220	Set Preset Tare value	Parameter ID = Scale number (1 – 8). Data to write = Desired Preset Tare value.
224	Start ‘Full Load Hours’ Ch. 1	Same as input for Chan. 1 activated. Also starts Operating time for Channel 1, even if parameter ‘1:Full Load Hours’ is Off.
225	Stop ‘Full Load Hours’ Ch. 1	Same as input for Chan. 1 deactivated. Also stops Operating time for Channel 1.
226	Start ‘Full Load Hours’ Ch. 2	Same as input for Chan. 2 activated. Also starts Operating time for Channel 2, even if parameter ‘2:Full Load Hours’ is Off.
227	Stop ‘Full Load Hours’ Ch. 2	Same as input for Chan. 2 deactivated. Also stops Operating time for Channel 2.
228	Start ‘Full Load Hours’ Ch. 3	Same as input for Chan. 3 activated. Also starts Operating time for Channel 3, even if parameter ‘3:Full Load Hours’ is Off.
229	Stop ‘Full Load Hours’ Ch. 3	Same as input for Chan. 3 deactivated. Also stops Operating time for Channel 3.
230	Start ‘Full Load Hours’ Ch. 4	Same as input for Chan. 4 activated. Also starts Operating time for Channel 4, even if parameter ‘4:Full Load Hours’ is Off.
231	Stop ‘Full Load Hours’ Ch. 4	Same as input for Chan. 4 deactivated. Also stops Operating time for Channel 4.
232	Start ‘Full Load Hours’ Ch. 5	Same as input for Chan. 5 activated. Also starts Operating time for Channel 5, even if parameter ‘5:Full Load Hours’ is Off.
233	Stop ‘Full Load Hours’ Ch. 5	Same as input for Chan. 5 deactivated. Also stops Operating time for Channel 5.
234	Start ‘Full Load Hours’ Ch. 6	Same as input for Chan. 6 activated. Also starts Operating time for Channel 6, even if parameter ‘6:Full Load Hours’ is Off.
235	Stop ‘Full Load Hours’ Ch. 6	Same as input for Chan. 6 deactivated. Also stops Operating time for Channel 6.
236	Start ‘Full Load Hours’ Ch. 7	Same as input for Chan. 7 activated. Also starts Operating time for Channel 7, even if parameter ‘7:Full Load Hours’ is Off.
237	Stop ‘Full Load Hours’ Ch. 7	Same as input for Chan. 7 deactivated. Also stops Operating time for Channel 7.

Cmd	Action activated in instrument	Description
238	Start ‘Full Load Hours’ Ch. 8	Same as input for Chan. 8 activated. Also starts Operating time for Channel, 8 even if parameter ‘8:Full Load Hours’ is Off.
239	Stop ‘Full Load Hours’ Ch. 8	Same as input for Chan. 8 deactivated. Also stops Operating time for Channel 8.
241	Clear ‘Service Information’	Used to save and clear all gathered ‘Service Information’ data
242	Start ‘Mean value’ calculation	Starts the ‘Mean value calculations’
243	Stop ‘Mean value’ calculation	Stops the ‘Mean value calculations’
244	Save ‘Service Information’	Used to save all gathered Service Information data to a file in the ‘ServiceInfo’ area in the file system
252	Clear the Program reset bit in the Instrument Status register.	Parameter ID = don’t care No data to write

3.4 Connection 1 input data

The input data of connection 1 is the Assembly Instance 101 (Producing instance). Connection 1 input data consists of 40 bytes as described in table below. This instance contains the gross and net weights of Scales 1 and 2. Least significant byte is always first.

Bytes	Contents	Size	
0 – 1	Instrument error	2 bytes	
2	Instrument Status	1 byte	
3	Instrument State	1 byte	
4 – 5	Command acknowledge	2 bytes	
6 – 7	Command error	2 bytes	
8 – 9	Level 1 – 16, status	2 bytes	
10 – 11	Level 17 – 32, status	2 bytes	
12 – 13	Not Used	2 bytes	
14 – 15	Not Used	2 bytes	
16 – 17	Error code	2 bytes	Scale 1
18 – 19	Scale status	2 bytes	
20 – 23	Gross weight	4 bytes	
24 – 27	Net weight	4 bytes	
28 – 29	Error code	2 bytes	Scale 2
30 – 31	Scale status	2 bytes	
32 – 35	Gross weight	4 bytes	
36 – 39	Net weight	4 bytes	

3.5 Connection 2 Input data

The input data of connection 2 is the Assembly Instance 102 (Producing instance). Connection 2 input data consists of 64 bytes as described in table below. This instance contains the gross and net weights of Scales 1 to 4. Least significant byte is always first.

Bytes	Contents	Size	
0 – 1	Instrument error	2 bytes	
2	Instrument Status	1 byte	
3	Instrument State	1 byte	
4 – 5	Command acknowledge	2 bytes	
6 – 7	Command error	2 bytes	
8 – 9	Level 1 – 16, status	2 bytes	
10 – 11	Level 17 – 32, status	2 bytes	
12 – 13	Not Used	2 bytes	
14 – 15	Not Used	2 bytes	
16 – 17	Error code	2 bytes	Scale 1
18 – 19	Scale status	2 bytes	
20 – 23	Gross weight	4 bytes	
24 – 27	Net weight	4 bytes	
28 – 29	Error code	2 bytes	Scale 2
30 – 31	Scale status	2 bytes	
32 – 35	Gross weight	4 bytes	
36 – 39	Net weight	4 bytes	
40 – 41	Error code	2 bytes	Scale 3
42 – 43	Scale status	2 bytes	
44 – 47	Gross weight	4 bytes	
48 – 51	Net weight	4 bytes	
52 – 53	Error code	2 bytes	Scale 4
54 – 55	Scale status	2 bytes	
56 – 59	Gross weight	4 bytes	
60 – 63	Net weight	4 bytes	

3.6 Connection 3 Input data

The input data of connection 3 is the Assembly Instance 103 (Producing instance). Connection 3 input data consists of 88 bytes as described in table below. This instance contains the gross and net weights of Scales 1 to 6. Least significant byte always first.

Bytes	Contents	Size	
0 – 1	Instrument error	2 bytes	
2	Instrument Status	1 byte	
3	Instrument State	1 byte	
4 – 5	Command acknowledge	2 bytes	
6 – 7	Command error	2 bytes	
8 – 9	Level 1 – 16, status	2 bytes	
10 – 11	Level 17 – 32, status	2 bytes	
12 – 13	Not Used	2 bytes	
14 – 15	Not Used	2 bytes	
16 – 17	Error code	2 bytes	Scale 1
18 – 19	Scale status	2 bytes	
20 – 23	Gross weight	4 bytes	
24 – 27	Net weight	4 bytes	
28 – 29	Error code	2 bytes	Scale 2
30 – 31	Scale status	2 bytes	
32 – 35	Gross weight	4 bytes	
36 – 39	Net weight	4 bytes	
40 – 41	Error code	2 bytes	Scale 3
42 – 43	Scale status	2 bytes	
44 – 47	Gross weight	4 bytes	
48 – 51	Net weight	4 bytes	
52 – 53	Error code	2 bytes	Scale 4
54 – 55	Scale status	2 bytes	
56 – 59	Gross weight	4 bytes	
60 – 63	Net weight	4 bytes	
64 – 65	Error code	2 bytes	Scale 5
66 – 67	Scale status	2 bytes	
68 – 71	Gross weight	4 bytes	
72 – 75	Net weight	4 bytes	
76 – 77	Error code	2 bytes	Scale 6
78 – 79	Scale status	2 bytes	
80 – 83	Gross weight	4 bytes	
84 – 87	Net weight	4 bytes	

3.7 Connection 4 Input data

The input data of connection 4 is the Assembly Instance 104 (Producing instance). Connection 4 input data consists of 112 bytes as described in table below. This instance contains the gross and net weights of Scales 1 to 8.

Bytes	Contents	Size	
0 – 1	Instrument error	2 bytes	
2	Instrument Status	1 byte	
3	Instrument State	1 byte	
4 – 5	Command acknowledge	2 bytes	
6 – 7	Command error	2 bytes	
8 – 9	Level 1 – 16, status	2 bytes	
10 – 11	Level 17 – 32, status	2 bytes	
12 – 13	Not Used	2 bytes	
14 – 15	Not Used	2 bytes	
16 – 17	Error code	2 bytes	Scale 1
18 – 19	Scale status	2 bytes	
20 – 23	Gross weight	4 bytes	
24 – 27	Net weight	4 bytes	
28 – 29	Error code	2 bytes	Scale 2
30 – 31	Scale status	2 bytes	
32 – 35	Gross weight	4 bytes	
36 – 39	Net weight	4 bytes	
40 – 41	Error code	2 bytes	Scale 3
42 – 43	Scale status	2 bytes	
44 – 47	Gross weight	4 bytes	
48 – 51	Net weight	4 bytes	
52 – 53	Error code	2 bytes	Scale 4
54 – 55	Scale status	2 bytes	
56 – 59	Gross weight	4 bytes	
60 – 63	Net weight	4 bytes	

Bytes	Contents	Size	
64 – 65	Error code	2 bytes	Scale 5
66 – 67	Scale status	2 bytes	
68 – 71	Gross weight	4 bytes	
72 – 75	Net weight	4 bytes	
76 – 77	Error code	2 bytes	Scale 6
78 – 79	Scale status	2 bytes	
80 – 83	Gross weight	4 bytes	
84 – 87	Net weight	4 bytes	
88 – 89	Error code	2 bytes	Scale 7
90 – 91	Scale status	2 bytes	
92 – 95	Gross weight	4 bytes	
96 – 99	Net weight	4 bytes	
100 – 101	Error code	2 bytes	Scale 8
102 – 103	Scale status	2 bytes	
104 – 107	Gross weight	4 bytes	
108 – 111	Net weight	4 bytes	

Table continues in right column

3.8 Connection 1 - 4 Instrument info

Least significant byte is always first.

Bytes 0 and 1:

Contains the actual instrument error information (the value 0 means no error). Please refer to the Technical Manual for details on error codes.

Byte 2:

Instrument Status

Bit	Function	Description
0	Remote operation	'1' = On / '0' = Off
1	Program reset	The bit is set each time the program starts, and it indicates that volatile data is lost. To reset this bit with fieldbus interface the reset command must be used. Care must be taken if more than one interface is used to communicate with the instrument and the Program reset bit is to be used.
2	Free memory (disk) space is low	It is not possible to save any files in the instrument.
3	Rope not zeroed	Rope not zeroed after power on.
4-7	Not used	

Byte 3:

Instrument State

Code	State	Description
00	Starting up	The instrument is starting up after a reset or power on.
01	Wait for start	The instrument is waiting for a start command to go in process.
02	Warming up	The parameter 'Warm up time' is set to a value other than zero, and the instrument is waiting for the warming up time to pass.
03	Normal	There are no parameter errors in the system. **Note:** Weight errors still indicate normal state.
04	Error	An error has been detected during start-up of the instrument.
05	Fatal error	An error has been detected during start-up of the instrument. It's not possible to enter any other state from here.
06	Power fail	A power fail has been detected and the instrument will respond to communication for a short moment until the power supply reserves are empty (this is normally just a few ms). Weight values should be regarded as invalid.

3.9 Connection 1 - 4 Command response

Least significant byte is always first.

Byte 4 and 5:

The ‘Command acknowledge’. It will be equal to the command number if the command was successfully executed. If the command failed the value 240 (hex F0) is returned.

Byte 6 and 7:

These bytes return the ‘Command error’ code. The error code is explained in chapter ‘Troubleshooting – Error codes’ in the Technical manual. These bytes will be zero if a command is correctly executed.

3.10 Connection 1 - 4 Level status

Bit set to 1 indicates that the weight is above the corresponding level.

Bytes 8 and 9:

These bytes show the status of levels 1 – 16.

Bit 0 to bit 7 in byte 8 is status of level 1 to level 8.

Bit 0 to bit 7 in byte 9 is status of level 9 to level 16.

Bytes 10 to 11:

These bytes show the status of levels 17 – 32.

Bit 0 to bit 7 in byte 10 is status of level 17 to level 24.

Bit 0 to bit 7 in byte 11 is status of level 25 to level 32.

3.11 Connection 1 - 4 Scale data

Error code
The bytes Error Code for scale ‘N’ (1 – 8) holds the error code for the scale. Normally this register should contain ‘0’ which means no error. Error codes 0 to 255 are valid in this register. Please refer to the Technical Manual for details on error codes.

The error code consists of 2 bytes of data. Scale 1 is bytes 16 and 17, scale 2 is bytes 28 and 29 etc. Least significant byte is always first.

Scale status
Status for scale ‘N’ (1 – 8). Bits set to 1 in this register have the following meaning:
The status consists of 2 bytes of data. Scale 1 is bytes 18 and 19, scale 2 is bytes 30 and 31 etc. Least significant byte is always first.

Bit no	Function	Comment
0	Not Used	
1	Not Used	
2	Not Used	
3	Good zero (disp. weight)	
4	Good zero Gross	
5	Good zero Net	
6	Net Mode	'1' = Net mode ‘0' = Gross mode
7	Motion	Unstable weight
8	Rope weight compensation	Rope weight compensation for Main hoist is On.
9	Replacement channel	This channel is using a Replacement channel for calculation of Crane weights.
10	Mean value calculation	Mean value calculations are running.
11	Not used	
12	Net weight > 6 digits	The net weight value is out of precision and should normally not be used.
13	Gross weight > 6 digits	The gross weight value is out of precision and should normally not be used.
14	Not used	
15	Not used	

Gross and net weight
The gross and net weight are only valid when the ‘Scale X:Error Code’ equals 0. Any other error code indicates that the weight is invalid.
The weight consists of 4 bytes of data in floating point format. Scale 1 gross weight is bytes 20 to 23, scale 2 gross weight is bytes 32 to 35 etc. Least significant byte is always first.

3.12 Connection 5 Input data

The input data of connection 5 is the Assembly Instance 105 (Producing instance). Connection 5 input data consists of 38 bytes as described in table below. This instance contains the output value of analog outputs 1 to 4, digital input status, digital output status and time and date. Least significant byte is always first.

Bytes	Contents	Size
0 – 3	Analog output 1	4 bytes
4 – 7	Analog output 2	4 bytes
8 – 11	Analog output 3	4 bytes
12 – 15	Analog output 4	4 bytes
16	Status of Inputs Slot 1	1 byte
17	Status of Inputs Slot 2	1 byte
18	Status of Inputs Slot 3	1 byte
19	Status of Inputs Slot 4	1 byte
20	Status of Inputs Slot 5	1 byte
21	Status of Inputs Slot 6	1 byte
22	Status of Outputs Slot 1	1 byte
23	Status of Outputs Slot 2	1 byte
24	Status of Outputs Slot 3	1 byte
25	Status of Outputs Slot 4	1 byte
26	Status of Outputs Slot 5	1 byte
27	Status of Outputs Slot 6	1 byte
28 – 29	Clock, Year	2 bytes
30 – 31	Clock, Month	2 bytes
32 – 33	Clock, Day	2 bytes
34 – 35	Clock, Hour	2 bytes
36 – 37	Clock, Minute	2 bytes

The Analog output is represented of a floating point value rounded to 3 decimals. It can be either a current value or a voltage value depending on how the module is configured.
A set bit in an Input or Output status Byte indicates that the corresponding input or output is activated. The number of inputs or outputs for a specific slot depends on the type of I/O module in that slot. Bit 0 correspond to input/output 1, bit 1 to input/output 2 etc.

Clock information consists of 2 bytes integer format per group (year, month etc.). The least significant byte is first.

3.13 Connection 6 Input data

The input data of connection 6 is the Assembly Instance 106 (Producing instance). Connection 6 input data consists of 32 bytes as described in table below. This instance contains the Preset Tare values of scales 1 to 8. The data is in floating point format. Least significant byte is always first.

Bytes	Contents	Size
0 – 3	Preset Tare Scale 1	4 bytes
4 – 7	Preset Tare Scale 2	4 bytes
8 – 11	Preset Tare Scale 3	4 bytes
12 – 15	Preset Tare Scale 4	4 bytes
16 – 19	Preset Tare Scale 5	4 bytes
20 – 23	Preset Tare Scale 6	4 bytes
24 – 27	Preset Tare Scale 7	4 bytes
28 – 31	Preset Tare Scale 8	4 bytes

3.14 Connection 7 Input data

The input data of connection 7 is the Assembly Instance 107 (Producing instance). Connection 7 input data consists of 128 bytes as described in table below. This instance contains data of Level values 1 to 32 in floating point format. Least significant byte is always first.

Bytes	Contents	Size
0 – 3	Level 1	4 bytes
4 – 7	Level 2	4 bytes
8 – 11	Level 3	4 bytes
12 – 15	Level 4	4 bytes
16 – 19	Level 5	4 bytes
20 – 23	Level 6	4 bytes
24 – 27	Level 7	4 bytes
28 – 31	Level 8	4 bytes
32 – 35	Level 9	4 bytes
36 – 39	Level 10	4 bytes
40 – 43	Level 11	4 bytes
44 – 47	Level 12	4 bytes
48 – 51	Level 13	4 bytes
52 – 55	Level 14	4 bytes
56 – 59	Level 15	4 bytes
60 – 63	Level 16	4 bytes

Bytes	Contents	Size
64 – 67	Level 17	4 bytes
68 – 71	Level 18	4 bytes
72 – 75	Level 19	4 bytes
76 – 79	Level 20	4 bytes
80 – 83	Level 21	4 bytes
84 – 87	Level 22	4 bytes
88 – 91	Level 23	4 bytes
92 – 95	Level 24	4 bytes
96 – 99	Level 25	4 bytes
100 – 103	Level 26	4 bytes
104 – 107	Level 27	4 bytes
108 – 111	Level 28	4 bytes
112 – 115	Level 29	4 bytes
116 – 119	Level 30	4 bytes
120 – 123	Level 31	4 bytes
124 – 127	Level 32	4 bytes

3.15 Connection 8 Input data

The input data of connection 8 is the Assembly Instance 108 (Producing instance). Connection 8 input data consists of 64 bytes as described in table below. This instance is Not used and data have values zero. The data is in floating point format. Least significant byte is always first.

Bytes	Contents	Size
0 – 3	Not Used	4 bytes
4 – 7	Not Used	4 bytes
8 – 11	Not Used	4 bytes
12 – 15	Not Used	4 bytes
16 – 19	Not Used	4 bytes
20 – 23	Not Used	4 bytes
24 – 27	Not Used	4 bytes
28 – 31	Not Used	4 bytes
32 – 35	Not Used	4 bytes
36 – 39	Not Used	4 bytes
40 – 43	Not Used	4 bytes
44 – 47	Not Used	4 bytes
48 – 51	Not Used	4 bytes
52 – 55	Not Used	4 bytes
56 – 59	Not Used	4 bytes
60 – 63	Not Used	4 bytes

3.16 Connection 9 Input data

The input data of connection 9 is the Assembly Instance 109 (Producing instance). Connection 9 input data consists of 64 bytes as described in table below. This instance is Not used and data have values zero. The data is in floating point format. Least significant byte is always first.

Bytes	Contents	Size
0 – 3	Not Used	4 bytes
4 – 7	Not Used	4 bytes
8 – 11	Not Used	4 bytes
12 – 15	Not Used	4 bytes
16 – 19	Not Used	4 bytes
20 – 23	Not Used	4 bytes
24 – 27	Not Used	4 bytes
28 – 31	Not Used	4 bytes
32 – 35	Not Used	4 bytes
36 – 39	Not Used	4 bytes
40 – 43	Not Used	4 bytes
44 – 47	Not Used	4 bytes
48 – 51	Not Used	4 bytes
52 – 55	Not Used	4 bytes
56 – 59	Not Used	4 bytes
60 – 63	Not Used	4 bytes

3.17 Connection 10 Input data

The input data of connections 10 is the Assembly Instance 110 (Producing instance). Connection 10 input data consists of 64 bytes as described in table below. This instance is Not used and data have values zero. The data is in floating point format. Least significant byte is always first.

Bytes	Contents	Size
0 - 3	Not Used	4 bytes
4 - 7	Not Used	4 bytes
8 - 11	Not Used	4 bytes
12 - 15	Not Used	4 bytes
16 - 19	Not Used	4 bytes
20 - 23	Not Used	4 bytes
24 - 27	Not Used	4 bytes
28 - 31	Not Used	4 bytes
32 - 35	Not Used	4 bytes
36 - 39	Not Used	4 bytes
40 - 43	Not Used	4 bytes
44 - 47	Not Used	4 bytes
48 - 51	Not Used	4 bytes
52 - 55	Not Used	4 bytes
56 - 59	Not Used	4 bytes
60 - 63	Not Used	4 bytes

3.18 Connection 11 Input data

The input data of connection 11 is the Assembly Instance 111 (Producing instance). Connection 11 input data consists of 64 bytes as described in table below.

This instance is Not used and data have value zero. The data is in floating point format. Least significant byte is always first.

Bytes	Contents	Size
0 - 3	Not Used	4 bytes
4 - 7	Not Used	4 bytes
8 - 11	Not Used	4 bytes
12 - 15	Not Used	4 bytes
16 - 19	Not Used	4 bytes
20 - 23	Not Used	4 bytes
24 - 27	Not Used	4 bytes
28 - 31	Not Used	4 bytes
32 - 35	Not Used	4 bytes
36 - 39	Not Used	4 bytes
40 - 43	Not Used	4 bytes
44 - 47	Not Used	4 bytes
48 - 51	Not Used	4 bytes
52 - 55	Not Used	4 bytes
56 - 59	Not Used	4 bytes
60 - 63	Not Used	4 bytes

3.19 Connection 12 Input data

The input data of connection 12 is the Assembly Instance 112 (Producing instance). Connection 12 input data consists of 48 bytes as described in table below.

This instance is Not used and data have values zero.

Data with 2 bytes are in 16-bits integer.

Data with 4 bytes are in 32-bits floating point format.

Least significant byte is always first.

Bytes	Contents	Size	Type
0 - 1	Not Used	2 bytes	INT16
2 - 3	Not Used	2 bytes	INT16
4 - 5	Not Used	2 bytes	INT16
6 - 7	Not Used	2 bytes	INT16
8 - 9	Not Used	2 bytes	INT16
10 - 11	Not Used	2 bytes	INT16
12 - 13	Not Used	2 bytes	INT16
14 - 15	Not Used	2 bytes	INT16
16 - 19	Not Used	4 bytes	FLOAT32
20 - 23	Not Used	4 bytes	FLOAT32
24 - 27	Not Used	4 bytes	FLOAT32
28 - 31	Not Used	4 bytes	FLOAT32
32 - 35	Not Used	4 bytes	FLOAT32
36 - 39	Not Used	4 bytes	FLOAT32
40 - 43	Not Used	4 bytes	FLOAT32
44 - 47	Not Used	4 bytes	FLOAT32

3.20 Connection 13 Input data

The input data of connection 13 is the Assembly Instance 113 (Producing instance). Connection 13 input data consists of 48 bytes as described in table below.

This instance contains Scale error codes and Input signal (mV/V) for scale 1 to 8.

Scale error codes are in 16-bits integer and Input signal (mV/V) are in 32-bits floating point format. Least significant byte is always first.

The ‘Scale X Input signal’ is only valid when the ‘Scale X:Error Code’ equals 0.

Bytes	Contents	Size	Type
0 - 1	Scale 1: Error code	2 bytes	INT16
2 - 3	Scale 2: Error code	2 bytes	INT16
4 - 5	Scale 3: Error code	2 bytes	INT16
6 - 7	Scale 4: Error code	2 bytes	INT16
8 - 9	Scale 5: Error code	2 bytes	INT16
10 - 11	Scale 6: Error code	2 bytes	INT16
12 - 13	Scale 7: Error code	2 bytes	INT16
14 - 15	Scale 8: Error code	2 bytes	INT16
16 - 19	Scale 1: Input signal (mV/V)	4 bytes	FLOAT32
20 - 23	Scale 2: Input signal (mV/V)	4 bytes	FLOAT32
24 - 27	Scale 3: Input signal (mV/V)	4 bytes	FLOAT32
28 - 31	Scale 4: Input signal (mV/V)	4 bytes	FLOAT32
32 - 35	Scale 5: Input signal (mV/V)	4 bytes	FLOAT32
36 - 39	Scale 6: Input signal (mV/V)	4 bytes	FLOAT32
40 - 43	Scale 7: Input signal (mV/V)	4 bytes	FLOAT32
44 - 47	Scale 8: Input signal (mV/V)	4 bytes	FLOAT32

3.21 Connection 14 Input data

The input data of connection 14 is the Assembly Instance 114 (Producing instance). Connection 14 input data consists of 20 pcs of 32-bits floating point format data (80 bytes) as described in table below.

This instance contains Full Load Hours for Main hoist and Full Load Hours for all eight channels. The unit of measurement for Full Load Hours are in minutes.

The instance also contains Rope Weight and Rope Count value.

Data_1012 to Data_1020 are Not Used (values are 0).

Least significant byte is always first.

Bytes	Contents	Size
0 - 3	Full Load Hours Main hoist	4 bytes
4 - 7	Full Load Hours Channel 1	4 bytes
8 - 11	Full Load Hours Channel 2	4 bytes
12 - 15	Full Load Hours Channel 3	4 bytes
16 - 19	Full Load Hours Channel 4	4 bytes
20 - 23	Full Load Hours Channel 5	4 bytes
24 - 27	Full Load Hours Channel 6	4 bytes
28 - 31	Full Load Hours Channel 7	4 bytes
32 - 35	Full Load Hours Channel 8	4 bytes
36 - 39	Rope Weight	4 bytes
40 - 43	Rope Count	4 bytes
44 - 47	Data_1012	4 bytes
48 - 51	Data_1013	4 bytes
52 - 55	Data_1014	4 bytes
56 - 59	Data_1015	4 bytes
60 - 63	Data_1016	4 bytes
64 - 67	Data_1017	4 bytes
68 - 71	Data_1018	4 bytes
72 - 75	Data_1019	4 bytes
76 - 79	Data_1020	4 bytes

3.22 Connection 15 Input data

The input data of connection 15 is the Assembly Instance 115 (Producing instance). Connection 15 input data consists of 40 bytes as described in table below.

This instance contains 20 pcs of 16-bits integer data, that are Not used (values are 0). Least significant byte is always first.

Bytes	Contents	Size
0 - 1	Data_2001	2 bytes
2 - 3	Data_2002	2 bytes
4 - 5	Data_2003	2 bytes
6 - 7	Data_2004	2 bytes
8 - 9	Data_2005	2 bytes
10 - 11	Data_2006	2 bytes
12 - 13	Data_2007	2 bytes
14 - 15	Data_2008	2 bytes
16 - 17	Data_2009	2 bytes
18 - 19	Data_2010	2 bytes
20 - 21	Data_2011	2 bytes
22 - 23	Data_2012	2 bytes
24 - 25	Data_2013	2 bytes
26 - 27	Data_2014	2 bytes
28 - 29	Data_2015	2 bytes
30 - 31	Data_2016	2 bytes
32 - 33	Data_2017	2 bytes
34 - 35	Data_2018	2 bytes
36 - 37	Data_2019	2 bytes
38 - 39	Data_2020	2 bytes

3.23 Connection 16 Input data

The input data of connection 16 is the Assembly Instance 116 (Producing instance). Connection 16 input data consists of 80 bytes as described in table below.

This instance contains 20 pcs of 32-bits integer data, that are Not used (values are 0). Least significant byte is always first.

Bytes	Contents	Size
0 - 3	Data_3001	4 bytes
4 - 7	Data_3002	4 bytes
8 - 11	Data_3003	4 bytes
12 - 15	Data_3004	4 bytes
16 - 19	Data_3005	4 bytes
20 - 23	Data_3006	4 bytes
24 - 27	Data_3007	4 bytes
28 - 31	Data_3008	4 bytes
32 - 35	Data_3009	4 bytes
36 - 39	Data_3010	4 bytes
40 - 43	Data_3011	4 bytes
44 - 47	Data_3012	4 bytes
48 - 51	Data_3013	4 bytes
52 - 55	Data_3014	4 bytes
56 - 59	Data_3015	4 bytes
60 - 63	Data_3016	4 bytes
64 - 67	Data_3017	4 bytes
68 - 71	Data_3018	4 bytes
72 - 75	Data_3019	4 bytes
76 - 79	Data_3020	4 bytes

3.24 Connection 17 Input data

The input data of connection 17 is the Assembly Instance 117 (Producing instance). Connection 17 input data consist of 7 blocks of 2 pcs of 16-bits integer data and 2 pcs of 32-bits floating point format data (84 bytes) as described in table below.

This instance contains data for Main hoist, Side A, Side B, Side A-Side B and Sum all Channels.

Data_4021 to Data_4028 are Not Used (values are 0).

Least significant byte is always first.

Bytes	Contents	Size	Type
0 - 1	Main hoist: Error code	2 bytes	INT16
2 - 3	Main hoist: Status	2 bytes	INT16
4 - 7	Main hoist: Gross weight	4 bytes	FLOAT32
8 - 11	Main hoist: Net weight	4 bytes	FLOAT32
12 - 13	Side A: Error code	2 bytes	INT16
14 - 15	Side A: Status	2 bytes	INT16
16 - 19	Side A: Gross weight	4 bytes	FLOAT32
20 - 23	Side A: Net weight	4 bytes	FLOAT32
24 - 25	Side B: Error code	2 bytes	INT16
26 - 27	Side B: Status	2 bytes	INT16
28 - 31	Side B: Gross weight	4 bytes	FLOAT32
32 - 35	Side B: Net weight	4 bytes	FLOAT32
36 - 37	Side A - Side B: Error code	2 bytes	INT16
38 - 39	Side A - Side B: Status	2 bytes	INT16
40 - 43	Side A - Side B: Gross weight	4 bytes	FLOAT32
44 - 47	Side A - Side B: Net weight	4 bytes	FLOAT32
48 - 49	Sum All Channels: Error code	2 bytes	INT16
50 - 51	Sum All Channels: Status	2 bytes	INT16
52 - 55	Sum All Channels: Gross weight	4 bytes	FLOAT32
56 - 59	Sum All Channels: Net weight	4 bytes	FLOAT32
60 - 61	Data_4021	2 bytes	INT16
62 - 63	Data_4022	2 bytes	INT16
64 - 67	Data_4023	4 bytes	FLOAT32
68 - 71	Data_4024	4 bytes	FLOAT32
72 - 73	Data_4025	2 bytes	INT16
74 - 75	Data_4026	2 bytes	INT16
76 - 79	Data_4027	4 bytes	FLOAT32
80 - 83	Data_4028	4 bytes	FLOAT32

Error code for Crane weights
The bytes Error Code holds the error code for the Crane weights. Normally this register should contain ‘0’ which means no error. Error codes 0, 8 or 15 are valid. Please refer to the Technical Manual for details on error codes.

The error code consists of 2 bytes of data. Least significant byte is always first.

Status for Crane weights
Bits set to 1 have the following meaning:
The status consists of 2 bytes of data. Least significant byte is always first.

Bit no	Function	Comment
0	Not used	
1	Not used	
2	Not used	
3	Not used	
4	Not used	
5	Not used	
6	Net Mode	'1' = Net mode ‘0' = Gross mode Net mode is only active if ALL channels (scales) included in the crane weight is in Net mode.
7	Motion	Unstable weight
8	Rope weight compensation	Rope weight compensation for Main hoist is On.
9	Replacement channel	Some channel is using Replacement channel for calculation of Crane weights.
10	Mean value calculation	Mean value calculations are running.
11	Not used	
12	Net weight > 6 digits	The net weight value is out of precision and should normally not be used.
13	Gross weight > 6 digits	The gross weight value is out of precision and should normally not be used.
14	Not used	
15	Not used	

Gross and net weight
The gross and net weight are only valid when the ‘Error Code’ equals 0. Any other error code indicates that the weight is invalid.

The weight consists of 4 bytes of data in floating point format. Least significant byte is always first.

The Main Hoist weight is the sum of all channels (scales) included in the Main Hoist with any corrections. The correction of the Main Hoist weight can be ‘Rope Weight Compensation’ and/or ‘Main Hoist weight adjustment’.

All other crane weights are based on the channels (Scales) weights without any corrections.

4 Diagnostics

4.1 General

This chapter describes the EtherNet/IP related diagnostics functions when handled from the local display or via Remote Access.

These screens give the possibility to study the content of used instances (data to or from the scanner). The function is useful for advanced trouble shooting in case of problems with the communication.

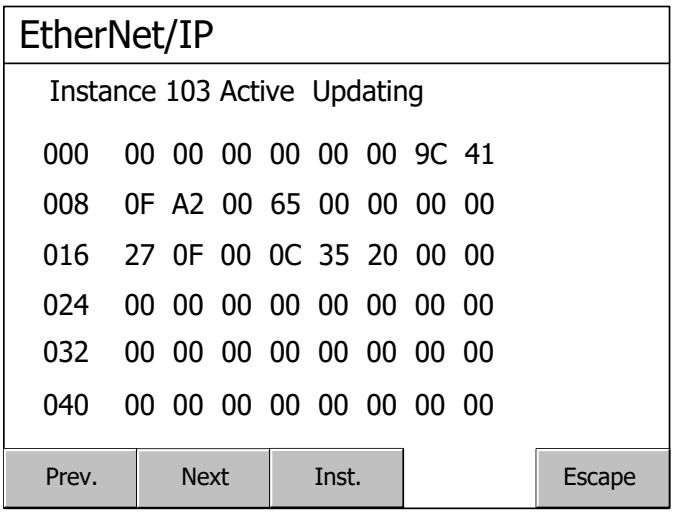
4.2 PM display

The content of the selected instance is displayed in hexadecimal form with up to six lines on the display. On each line eight byte values are displayed, preceded by the address of the first byte.

Keys F1 (Prev.) and F2 (Next) are used to scroll data if there is not enough room for all data on one screen.

Use key F3 (Inst.) to display next instance (100 – 101 – 102 – 103 – …… – 100 etc).

If a scanner is connected to this instance, ‘Active’ is shown. Otherwise ‘Inactive’ is shown. No data is shown if instance is inactive.



PM local display

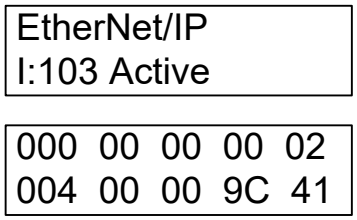
4.3 RM display

The content in the selected instance is displayed in hexadecimal form with two lines on the display. On each line four byte values are displayed, preceded by the address of the first byte.

The first screen show selected instance. If a scanner is connected to the shown instance Active is show else is Inactive shown. No data is shown if the instance is inactive.

The '+' and '–' keys are used to step the displayed addresses forwards / backwards.

Use key '↵' to' to display next instance (100 – 101 – 102 – 103 -……– 100 etc).

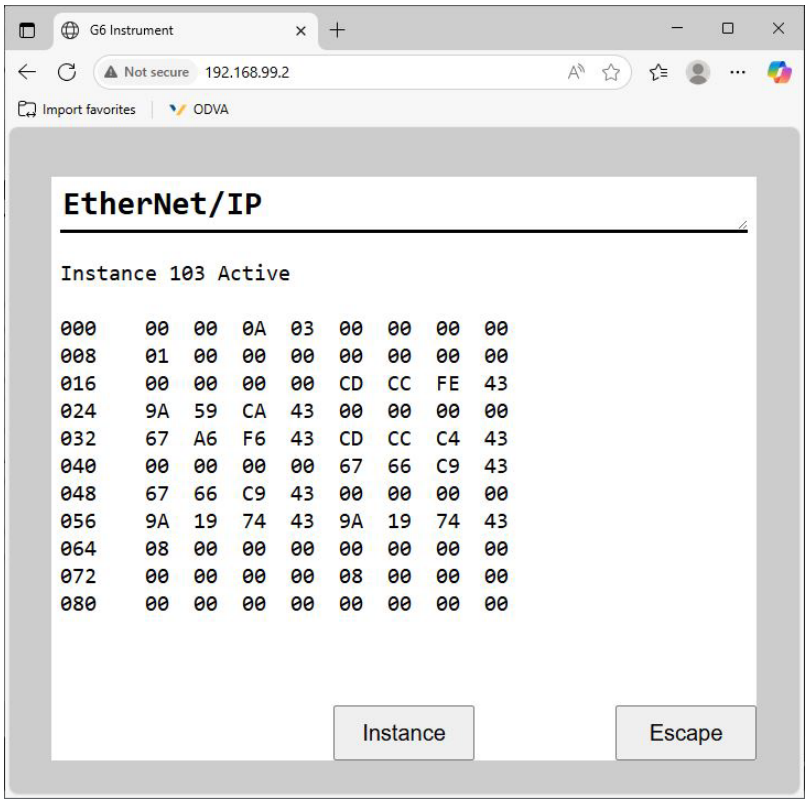


RM local display

4.4 Remote

Use key F3 (Inst.) to display next instance (100 – 101 – 102 – 103 – …… – 100 etc).

If a scanner is connected to this instance 'Active' is shown otherwise 'Inactive' is shown. No data is shown if instance is inactive.



4.5 Data format

This section describes data format of the EtherNet/IP interface with a few examples. Data is transmitted with the least significant byte first. When studying the diagnostics screen data is therefore shown least significant byte first. This is important when converting between floating point and integer data to hex representation.

Example Tare Main hoist command:

Command = 90, Parameter ID = no significance, Data = no significance

Byte no	Format	Diagn. Screen (hex)	Actual value	Description
0 – 1	16 bit integer	5A 00	90	Command
2 – 3	16 bit integer	–	–	Parameter ID
4 – 7	32 bit float	–	–	Float value

Complete message on diagnostics screen: 5A 00 XX XX XX XX XX XX

XX means no significance.

Example Enter remote operation command:

Command = 1, Parameter ID = no significance, Data = no significance

Byte no	Format	Diagn. Screen (hex)	Actual value	Description
0 – 1	16 bit integer	01 00	1	Command
2 – 3	16 bit integer	–	–	Parameter ID
4 – 7	32 bit float	–	–	Float value

Complete message on diagnostics screen: 01 00 XX XX XX XX XX XX

XX means no significance.

In a PLC data can be shown in different ways. Either it's shown as actual values in correct floating point format, integer format etc. Data can also be shown in hexadecimal format either as the bytes are transmitted or as they are interpreted i.e. least significant byte to the right.

Example

Float value 65.4

Hex format in G6 diagnostics screen: CD CC 82 42
(this is the order that the bytes are transmitted in).

PLC showing the data in hex format: 16#4282CCCD
(16# means hexadecimal representation)

The provided EDS file also includes AOP (Add On Profile) information that will simplify the use regarding parameter names and format.

5 Details on EtherNet/IP

The optional EtherNet/IP interface of the G6 Instrument enables Ethernet communication using the EtherNet/IP protocol. It is intended for accessing weight data, scale status, input and output status, level status, and analog output data. Commands for e.g. taring, zeroing etc. can be issued over the EtherNet/IP interface.

The interface is not intended for set-up of the instrument. Use the instrument front panel user interface or the web interface for set-up.

Note: OS Version shall be 8.0.5.11 or later.

Information about EtherNet/IP and the ODVA can be obtained from the ODVA web site: www.odva.org

The G6 Instrument is classified as a CIP Adapter Class device of Generic Device Type.

The EtherNet/IP interface of the instrument supports three types of transports:

1. Unconnected messaging
2. Class 3 connected messaging
3. Class 1 connected real-time data transfer (I/O connection)

Class 1 I/O connections can be set to a RPI (Requested Packet Interval) of 10 ms. It's strongly recommended to not set the RPI lower than needed or lower than the actual instrument update rate setting. Choosing lower than necessary RPI will only affect (degrade) the performance of the instrument specifically the user interface responsiveness and communication response delays.

The EDS file (Electronic Data Sheet) "BLHNobel_G6_C_EIP_V1.1.eds" for the EtherNet/IP interface has article number 200798 and applies to program version 4.1.x.

5.1 CIP Object definitions

The following CIP objects are defined in the instrument.

1. Identity Object.
2. Message Router.
3. Assembly Object.
4. Connection Manager Object.
5. TCP/IP Interface Object.
6. Ethernet Link Object.

5.2 Identity Object

The Identity Object class code is 0x01.

Supported Class Attributes:

No.	Attribute name	Value
1	Revision	1
2	Max Instance	1
3	Number of Instances	1
4	Optional Attribute list	0, Not supported
5	Optional Service list	0, Not supported
6	Max Class Attribute No	0, Not supported
7	Max Instance Attribute No	7

Supported Instance Attributes:

No.	Attribute name	Value
1	Vendor ID	1179
2	Device Type	Generic Device Type
3	Product Code	4
4	Revision	2.1
5	Status	
6	Serial Number	CPU module serial number
7	Product name	“G6 Modular Instrument”

Supported Services:

Code	Name	Class	Instance
0x01	Get_Attribute_All	Yes	Yes
0x0E	Get_Attribute_Single	Yes	Yes
0x05	Reset	Yes	Yes

The Reset Service support type 0 reset only. This is a power cycle type of reset.

5.3 Message Router Object

The Message Router Object class code is 0x02.

Supported Class Attributes:

No.	Attribute name	Value
1	Revision	1
2	Max Instance	1
3	Number of Instances	1
4	Optional Attribute list	2, 1, 2. 2 Optional attributes, no 1 and 2
5	Optional Service list	1, 0x0A
6	Max Class Attribute No	7
7	Max Instance Attribute No	2

Supported Instance Attributes:

No.	Attribute name	Value
1	Object list	6, 0x01, 0x02, 0x04, 0x06, 0xF5, 0xF6
2	Max number of connections	16

Supported Services:

Code	Name	Class	Instance
0x01	Get_Attribute_All	Yes	Yes
0x0A	Multiple_Service_Packet	No	Yes
0x0E	Get_Attribute_Single	Yes	Yes

5.4 Assembly Object

The Assembly Object class code is 0x04.

The Assembly object is used to receive and transmit data to and from the G6 instrument. This data is measurements, status, input and output status etc. Any communication regarding this type of instrument data is done through the Assembly object.

Note that the Assembly Object is defined as a static assembly meaning that it cannot be configured.

For convenience the instrument ignores any reference to any configuration instance. It will not generate an error response to a connection attempt that includes a configuration instance.

Supported Class Attributes:

No.	Attribute name	Value
1	Revision	2
2	Max Instance	117
3	Number of Instances	18
6	Max Class Attribute No	7
7	Max Instance Attribute No	4

Supported Instance Attributes:

No.	Attribute name	Remark
3	Data	
4	Size of Instance	See table below

Supported Services:

Code	Name	Class	Instance
0x0E	Get_Attribute_Single	Yes	Yes
0x10	Set_Attribute_Single	No	Yes (Instance 100 data only)

Assembly Object Instances

No.:	Direction of data	Size (bytes)	Description
100	Consumer	8	G6 control (data to the G6)
101	Producer	40	Scale 1 and scale 2.
102	Producer	64	Scale 1 to scale 4.
103	Producer	88	Scale 1 to scale 6.
104	Producer	112	Scale 1 to scale 8.
105	Producer	38	Analog out, dig I/O status, clock
106	Producer	32	Scale 1 – 8 Preset Tare values
107	Producer	128	Level 1 – 32 values
108	Producer	64	Not Used
109	Producer	64	Not Used
110	Producer	64	Not Used
111	Producer	64	Not Used
112	Producer	48	Not Used
113	Producer	48	Input signal Scale 1-8
114	Producer	80	Full Load Hours
115	Producer	40	Not Used
116	Producer	80	Not Used
117	Producer	84	Crane weights

5.5 Connection Manager

The Connection Manager class code is 0x06.

The minimum RPI (Requested Packed Interval) for all Class-1 connections is 10 ms.

The 32 Run/Idle-Header for Originator to Target Connection (Scanner to device) is required. The system supports Unicast and Multicast.

Supported Class Attributes:

No.	Attribute name	Value
1	Revision	1
2	Max Instance	1
3	Number of Instances	1
4	No. of instance attributes + list of attributes	8, 1, 2, 3, 4, 5, 6, 7, 8 (8 attributes, attributes 1 – 8 supported)
5	Optional Service List	0, Not supported
6	Max Class Attribute No	7
7	Max Instance Attribute No	8

Supported Instance Attributes:

No.	Attribute name	Value
1	Open requests	Actual counts
2	Open format rejects	Actual counts
3	Open resource rejects	Actual counts
4	Open other rejects	Actual counts
5	Close request	Actual counts
6	Close format rejects	Actual counts
7	Close other rejects	Actual counts
8	Connection timeouts	Actual counts

Supported Services:

Code	Name	Class	Instance
0x01	Get_Attribute_All	Yes	Yes
0x02	Set_Attribute_All	No	Yes
0x0E	Get_Attribute_Single	Yes	Yes
0x10	Set_Attribute_Single	No	Yes
0x4E	Forward_Close	No	Yes
0x54	Forward_Open	No	Yes
0x5A	Get_Connection_Owner	No	Yes

5.6 TCP/IP Interface Object

The TCP/IP Interface Object class code is 0xF5.

Supported Class Attributes:

No.	Attribute name	Value
1	Revision	3
2	Max Instance	1
3	Number of Instances	1
4	No. of instance optional attributes + list	2, 8, 9 (2 attributes, attributes 8 and 9 supported)
5	Optional Service List	0, Not supported
6	Max Class Attribute No	7
7	Max Instance Attribute No	9

Supported Instance Attributes:

No.	Attribute name	Remarks
1	Status	1
2	Configuration Capability	No configuration capability over EtherNet/IP
3	Configuration Control	No configuration control support
4	Physical Link Object	Ethernet Link Object
5	Interface Configuration	See EIP spec.
6	Host name	“G6ModInstr”
7	Safety network Number	0, Not supported
8	TTL Value	See EIP spec.
9	Mcast Config	See EIP spec.

Supported Services:

Code	Name	Class	Instance
0x0E	Get_Attribute_Single	Yes	Yes
0x01	Get_Attribute_All	Yes	Yes

5.7 Ethernet Link Object

The Ethernet Link Object class code is 0xF6.

Supported Class Attributes:

No.	Attribute name	Value
1	Revision	3
2	Max Instance	1
3	Number of Instances	1
4	No. of instance optional attributes + list	4, 7, 8, 9, 10 (4 attributes, attributes 7 to 10 supported)
5	Optional Service List	0, Not supported
6	Max Class Attribute No	7
7	Max Instance Attribute No	10

Supported Instance Attributes:

No.	Attribute name	Remarks
1	Interface Speed	Value 0 (Speed indeterminate)
2	Interface Flags	See EIP spec.
3	Physical Address	MAC Address
4	Interface Counters	0, Not supported
5	Media Counters	0, Not supported
6	Interface Control	0, Not supported
7	Interface Type	2, Twisted pair
8	Interface State	See EIP spec.
9	Admin State	-
10	Interface Label	IP address string

Supported Services:

Code	Name	Class	Instance
0x01	Get_Attribute_All	Yes	Yes
0x0E	Get_Attribute_Single	Yes	Yes

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