

xtreme DB

DP-34044-4 User Guide



| CONTENTS

1. Concerning this manual	3
2. Safety Information	3
2.1 Designated Use	3
2.2 Target Groups	3
2.3 Regulations	3
2.3.1 General Information	3
2.4 License Disclaimer	3
2.5 Example of Symbols	4
2.5.1 Use of Attention Signs	4
2.5.2 Use of Danger Signs	4
3. Installation Information	4
3.1 XtremeDB Installation	4
4. Module Overview	6
4.1 Configuring the Baud Rate	7
4.2 Configuring the Node ID	8
4.3 Powering the Module	9
4.4 LEDs	10
4.4.1 LED Status	11
4.5 Circuit Protection	12
5. Module Configuration	13
5.1 Configuration Steps	13
5.2 Output Configuration	16
5.2.1 Powering the Outputs	16
5.2.2 Output Layout	17
5.2.3 Configuring Outputs	18
5.2.4 Output Operation	20
5.3 Status Messages	24
5.3.1 Module Status	24
5.4 Data Sheet	26
5.4.1 Port Configuration	26
5.4.2 Technical Data	27
6. Message Structure	28
7. PGNs Used	38
8. Firmware Updates	39

* This user manual applies to firmware revision 34044-564-0111 or higher

1. CONCERNING THIS MANUAL

The text, illustrations, diagrams and examples used in this manual exist solely for the purpose of explaining the operation and usage of XtremeDB Input/Output modules. If you have any further questions regarding the installation and set-up of the equipment described in this manual, please do not hesitate to contact us. We will be glad to assist you. Murrelektronik reserves the right to make technical changes or modifications to this manual without prior notice.

2. SAFETY INFORMATION

2.1 DESIGNATED USE

The input/output modules of the XtremeDB series are designated for use only in those areas as described in this manual. Strict adherence to the data specified in this manual must be ensured. The products have been developed, manufactured, tested and documented in compliance with currently valid safety codes. The equipment poses no danger to operating personnel or material if configuration, assembly and operation are performed in compliance with the stated handling and safety regulations. Unqualified intervention in the hardware and software of our equipment, disregard of warning labels found on the equipment or non-observance of the information in this manual can result in injury or serious damage to man and/or material. Any application or usage beyond and above this shall be regarded as non-designated.



Warning!

Good chemical and oil resistance. When using aggressive mediums, material resistance based on application must be checked.

2.2 TARGET GROUPS

This manual addresses itself exclusively to qualified and trained electricians knowledgeable in the safety standards of automation technology. Only a qualified, trained electrical tradesman knowledgeable in the safety standards of mobile industry may perform configuration, installation, set-up, maintenance and testing of the equipment.

2.3 REGULATIONS

Current safety and accident prevention laws valid for a specific application must be observed in the configuration, installation, setup, and maintenance and testing of the equipment.

2.3.1 GENERAL INFORMATION

- a)** The designated function of this equipment is guaranteed only if the conditions for installation, system extension, operation and maintenance are complied with.
- b)** Only system accessories and cables are allowed that meet the requirements and regulations for safety, electromagnetic compatibility and, where applicable, telecommunications transmission equipment and specifications.
The installation of other accessories may violate these requirements and regulations or damage the equipment. Information concerning the type of authorized system extensions and cables can be obtained from your Murrelektronik distributor or taken from this manual.
- c)** The designated operation of the equipment is guaranteed only with the housing fully installed.
- d)** This product is designed and manufactured to assure protection against damage and hazards if designated usage and proper maintenance are observed.

2.4 LICENSE DISCLAIMER

EXCLUSION OF INCIDENTAL, CONSEQUENTIAL AND CERTAIN OTHER DAMAGES:

To the maximum extent permitted by applicable law, in no event shall Murrelektronik be liable for any special, incidental, indirect, or consequential damages whatsoever (including, but not limited to, damages for loss of profits or confidential or other information, for business interruption, for personal injury, for loss of privacy, for failure to meet any duty including of good faith or of reasonable care, for negligence, and for any other pecuniary or other loss whatsoever) arising out of or in any way related to the use of or inability to use the software product, the provision of or failure to provide support services, or otherwise under or in connection with any pro

vision of this End User License, even in the event of the fault, tort (including negligence), strict liability, breach of contract or breach of warranty of Murrelektronik, or any supplier, and even if Murrelektronik or any supplier has been advised of the possibility of such damages.

2.5 EXAMPLE OF SYMBOLS

2.5.1 USE OF ATTENTION SIGNS

Notes containing important information are specially marked. These are illustrated as follows:



Attention text...

2.5.2 USE OF DANGER SIGNS

Danger signs are indicated by text and a corresponding symbol inside of a frame



CAUTION!

Disregard of safety measures may result in damage to equipment and other serious consequences.

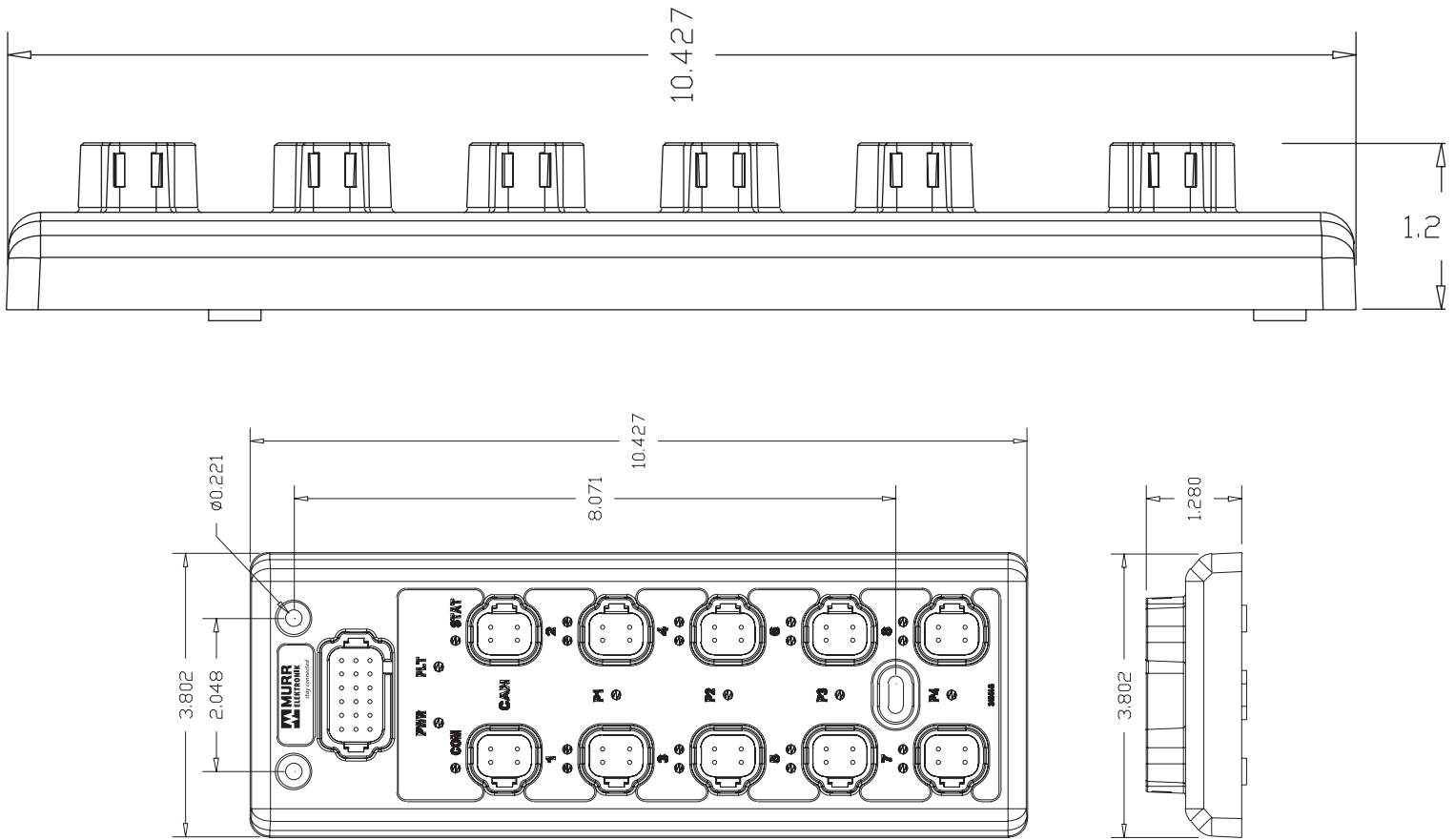
3. INSTALLATION

3.1 XtremeDB INSTALLATION

The XtremeDB blocks can be mounted directly on an installation panel or on a machine. The module features three mounting holes for this purpose. It must be assured that the mounting surface is smooth and flat to prevent mechanical stress in the module housing.



Proper installation and operation of the XtremeDB blocks requires the use of all ground connections. This includes Ground (A) for module power and Ground (B) for port power on the 18 pin configuration and power plug.



ATTENTION!

Modules must be mounted a minimum of 3mm from each other.

4. MODULE OVERVIEW



Configuration & Power Plug

CAN Ports 1 & 2 Non-Isolated

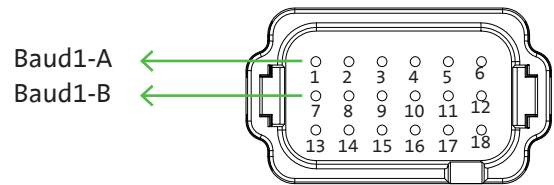
16 Outputs

4.1 CONFIGURING THE BAUD RATE

Configuration of the baud rate is done using pins 1 & 7 of the Power and Configuration plug shown below. Currently there are 2 baud rates supported, 250kb and 500kb. If you are connecting to a 250kb network no jumpers are required. If connecting to a 500kb network, jumper pin 1 to pin 7.



Configuration & Power Plug



Baud Rate

No Jumper = 250kb

Baud1-A to Baud1-B = 500kb



Please note that all devices on the same J1939 network must have the same baud rate



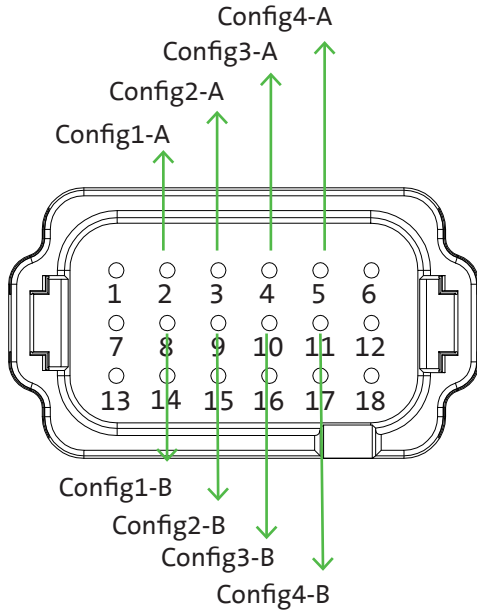
All unused pins need to be plugged with a Deutsch #114017 sealing plug to maintain the IP67 rating



A power cycle is required to “set” the baud rate.

4.2 CONFIGURING THE NODE ID

The Node ID is configured by jumpering the matching Config-A to Config-B. The Node ID starts with a base source address of **61408** (0xEFE0) with no jumpers installed. The offset address is configured with the use of binary coded decimal (BCD). A power cycle is required when changing the Node ID. If a duplicate source address is on the network on a power up our module will stay in address arbitration mode and will not function.



Node ID (0-15 Offset) in BCD

Config1-A (pin 2) to Config1-B (pin 8) = 1's
 Config2-A (pin 3) to Config2-B (pin 9) = 2's
 Config3-A (pin 4) to Config3-B (pin 10) = 4's
 Config4-A (pin 5) to Config4-B (pin 11) = 8's

Node ID	1's	2's	4's	8's	PGN	Source Address
0	0	0	0	0	61408	224
1	1	0	0	0	61409	225
2	0	1	0	0	61410	226
3	1	1	0	0	61411	227
4	0	0	1	0	61412	228
5	1	0	1	0	61413	229
6	0	1	1	0	61414	230
7	1	1	1	0	61415	231
8	0	0	0	1	61416	232
9	1	0	0	1	61417	233
10	0	1	0	1	61418	234
11	1	1	0	1	61419	235
12	0	0	1	1	61420	236
13	1	0	1	1	61421	237
14	0	1	1	1	61422	238
15	1	1	1	1	61423	239

EXAMPLE

Jumpers from pin 2 to pin 8 (1's) and pin 4 to pin 10 (4's)
 offset= 1+4=5
 61408 (base address) + 5 (Node ID) = 61413 (PGN)



Please note that all devices on the same J1939 network must have a different Node ID



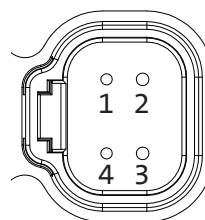
All unused pins need to be plugged with a Deutsch #114017 sealing plug to maintain the IP67 rating

4.3 POWERING THE MODULE

The module receives its power from the CAN ports. The module power is limited to 13 amps and is used to power connected modules down the line. This power is also used for all input ports as well.



CAN Ports 1 & 2 Non-Isolated



CAN
(J1939)
Pin 2 = CAN High
Pin 4 = CAN Low

Power
(Module & Input-13A)
Pin 1 = 8-32V DC
Pin 3 = Ground A



The connection between CAN1 & CAN2 for the power feed is not fused (protected from short circuit current). During installation the module power wiring on CAN1 & CAN2 pin 1 should have a 10-12A fuse before the modules



Please note that module power should NOT be used to power any output devices.



The first and last Node on the network must have a 120 Ohm terminating resistor.

4.4 LEDs

During start up the LEDs will come on for 3-5 seconds to verify that they are working (bulb test).

PWR LED - Blue

Indicates module power is connected

COM LED - Green

Communication Status

Buss Power - Blue

P1 = Power for ports 1 & 2
P2 = Power for ports 3 & 4
P3 = Power for ports 5 & 6
P4 = Power for ports 7 & 8

FLT LED - Red
Fault Status

STAT LED - Green
Module Status

PORT I/O LED - Yellow
Left LED = Output A
Right LED = Output B



4.4.1 LED STATUS

COM LED - Green

Communication Status

ID	COM Fault Description	ON	OFF
n/a	Bootload Mode	Indicates traffic on bus	N/A
C0	Valid Communication Network	ON	1 Long
C1	Source Address (SA) Arbitration	1 Short	
C2	CANBUS Hardware Fault	2 Short	
C3	Output Control Message Missing	3 Short	
C4	DM13 Detected*	4 Short	

* See J1939-73 diagnostics, another device has requested module to stop broadcasting

FLT LED - Red

Fault Status

ID	Fault Description	ON	OFF
F0	Bootload Mode	1 Short	1 Short
F1	Output Over Current Fault	1 Short	1 Long
F2	Low Voltage Warning	2 Short	
F3	Over Voltage Warning	3 Short	
F4	Over Temperature Warning	4 Short	
F5	Low Volts	5 Short	
F6	Spare	6 Short	
F7	Internal Module Fault	7 Short	

For 12V DC system, over voltage is defined as input voltage > 18V DC, low voltage is defined as < 11V DC.

For 24V DC system, over voltage is defined as input voltage > 32V DC, low voltage is defined as < 20V DC.

STAT LED - Green

ID	Fault Description	ON	OFF
S0	Configuration Saved	ON	

PORT I/O LED - Yellow

Left LED = Output A

Right LED = Output B

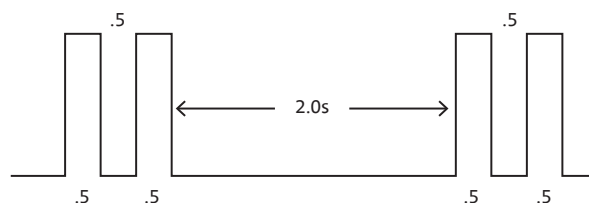
1. Steady on indicated output is on
2. Flashing indicates output is faulted

For All Tables:

Short = ON 500ms and OFF 500ms

Long = OFF defined as 2.0 s

Pulse Width is ± 50 ms



Example: C2 CANBUS Hardware Fault

4.5 CIRCUIT PROTECTION

Buss Power

The module shall monitor Power Buss Bank current and shut off all bank outputs if the maximum current exceeds 13 amps per buss. Both short circuit and overcurrent protection is provided.

- P1 = Ports 1 & 2 power, 13 amps.
- P2 = Ports 3 & 4 power, 13 amps.
- P3 = Ports 5 & 6 power, 13 amps.
- P4 = Ports 7 & 8 power, 13 amps.

Module Power

The module power delivered by the CAN ports has both short circuit and overcurrent protection. This circuit has a separate ground that is supplied by the CAN port as well, Ground (A)

Output Power

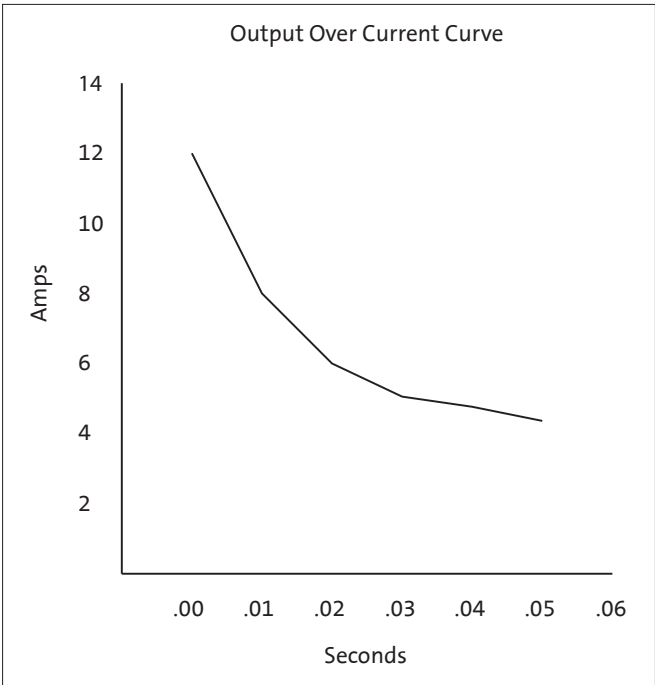
This module has both 10 amp and 4 amp outputs. The outputs have both short circuit and overcurrent protection. (See Figure 1)

- (2) 4A
- (2) 10A
- (6) 4A paired

Resetting an output fault will require cycling of the module power unless the Controller Mode Output Reset is enabled. If the Controller Mode Output Reset is enabled the fault will be reset if the output is turned off, limit of 5 times before a cycle of module power will be required.

An output fault will not effect other outputs on the module.

Figure 1



Sec	Amps
.00	12
.01	8
.02	6
.03	5.3
.04	4.8
.05	4.4

5. MODULE CONFIGURATION

5.1 CONFIGURATION STEPS

Module default configuration:

- Factory Default Config returns 1 in Status message 1-Status 1, this should not be on if the module has been configured.
- Default operation of the module is on/off digital control. PWM control messages are not needed.
- Default configuration does not require a Command 0x52 message to enable operation.

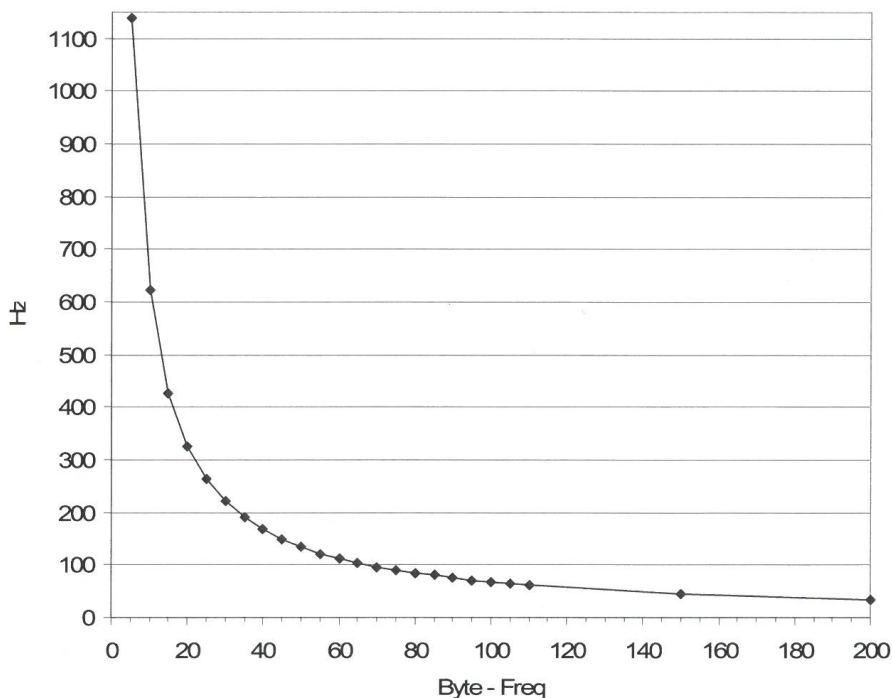
Command 0x52 (This message needs to be sent until the message confirmation bit is set true):

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message you're sending)
Ctrl Mode Reset	2 bit	2	1,2	Enables Controller Mode Output Reset. Enabled (01) = cycling the output will reset the fault, if (00) power cycle required for fault reset
Enable (Status Msg 1)			3,4	Enables the constant transmission of status message 1
Enable (Status Msg 2)			5,6	Enables the constant transmission of status message 2
Enable (Amp Msg)			7,8	Enable the constant transmission of amperage message
Enable 24V DC		3	1,2	Enables the low and over voltage fault limits for 24V DC system
Save Configuration			3,4	Saves the configuration to the module (otherwise changes only valid until a power cycle occurs), set to 1 to write configuration to module
			5,6	
			7,8	
		4	1,2	
			3,4	
			5,6	
			7,8	
FREQ1	Word	5		Sets the configuration of the frequency for all channels (30-1140 Hz) value = 0x 01-FE
		6		
MODE1	4 bit	7		Sets the configuration of ALL the outputs, overrides Command 53 and 54. (0=Mode 1 NOT USED, 1=ON/OFF, 2=Data 0-4000, 3= Percent 0-100.0%(0-1000))
MODE2	4 bit			Sets the configuration of ALL the inputs. (NOT USED ON THIS MODULE)
ID1	Byte	8		User defined byte for configuration ID, this will be transimitted in the STAT message.

- Module configuration message, needed when not using module default configuration.
- All Status messages need to be turned on (set to value of 1) to be received.
- Enable 24V DC: Enables the low and over voltage fault limits for 24V DC system, otherwise feeding 24V DC to 12V DC system would cause system over voltage error. This is also used for the output overcurrent and short circuit detection.
- FREQ1: There needs to be a value put in this parameter or the outputs won't work.

Frequency Pre-Scale to Hz							
Setting	Hz	Setting	Hz	Setting	Hz	Setting	Hz
5	1140	35	190	65	104	95	71
10	622	40	167	70	96	100	68
15	427	45	148	75	90	105	65
20	325	50	134	80	84	110	62
25	263	55	122	85	80	150	45
30	221	60	112	90	75	200	34

Frequency Settings



- Mode 1: Configure all the outputs at the same time, override Command 0x53.
- Mode 2: Configure all the inputs at the same time, override Command 0x53 and 0x54.
- ID1: This is used to give a number to the node that will be transmitted back in Status Message 1-User ID. Default as 0, please note this User ID is not node ID (node address), please see “Configuring the Node ID” for setting node address.
- Save Configuration: Turn on the bits (value of 1) after configuring module, inputs and outputs, otherwise changes will only be saved until power cycle.

Command 0x53 & 54 (These messages only need to be sent one time):

- Configure individual input and output modes if they haven’t been configured in Mode 1 and Mode 2 in Command 0x52.

Command 0x54, 55 & 56 (These messages only need to be sent one time, unless a change is made to one of the variables):

- Configure the Kp and Ki for any PWM current controls.

Command 0x57 (This message needs to be written all the time if a person is controlling the counter. A person needs to keep the counter on and needs to be able to reset the count):

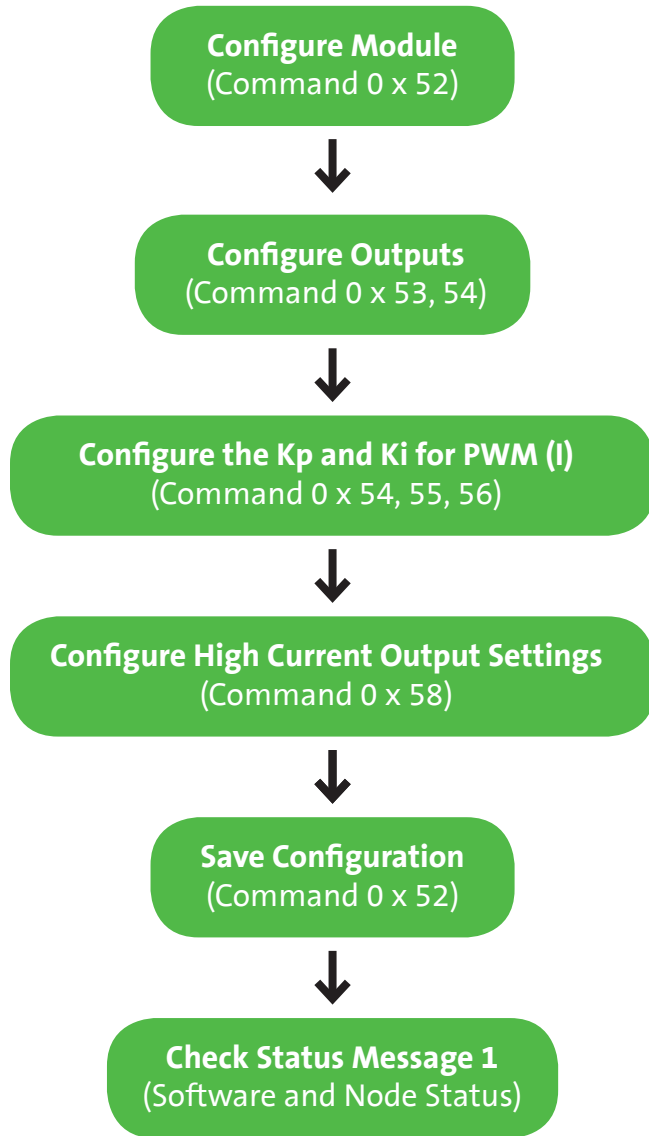
- Configure the counters/encoder if using.

Status messages - Status message 1 PGN (EF(Controller Source Address)):

- Status 1 – Factory default configuration returns a value of 1, this should not be on if a module has been configured.
- Status 2 – Configuration Saved returns a value of 1 if the alternate configuration was on (value of 1) and saved the configuration using “Save Configuration” in Command 52.
- Status 3 – Alternate configuration, a new configuration was made to the module but hasn’t been saved.
- Status 7, 9-14 – Returns a value of 1 each time a Command message 52-58 is sent, to ensure each configuration has been sent. This is on for a brief moment and then resets.

Command 0x51(Outputs digital control and Inputs power control) and PWM control messages need to be consistently sent. Please note PGNs are changing based on Node ID (node address), see section “PGNs USED” for details.

Configuration Sample Flowchart:

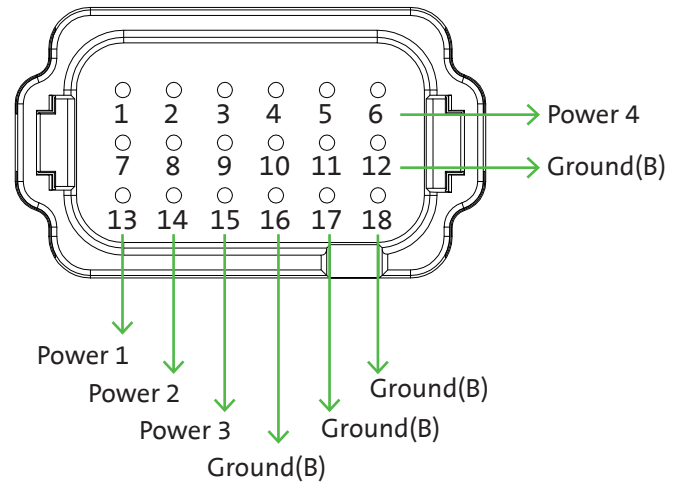


5.2 OUTPUT CONFIGURATION



5.2.1 POWERING THE OUTPUTS

Configuration & Power Plug



Power (Output only)

Power 1 = 13 amps for ports 1 & 2 (Outputs 1A, 1B, 2A, 2B)

Power 2 = 13 amps for ports 3 & 4 (Outputs 3A, 3B, 4A, 4B)

Power 3 = 13 amps for ports 5 & 6 (Outputs 5A, 5B, 6A, 6B)

Power 4 = 13 amps for ports 7 & 8 (Outputs 7A, 7B, 8A, 8B)

Ground(B)=

output ground, internally connected to all Ground B pins



Please note that **ALL** module power connections need to be made in order to receive power on all output ports.

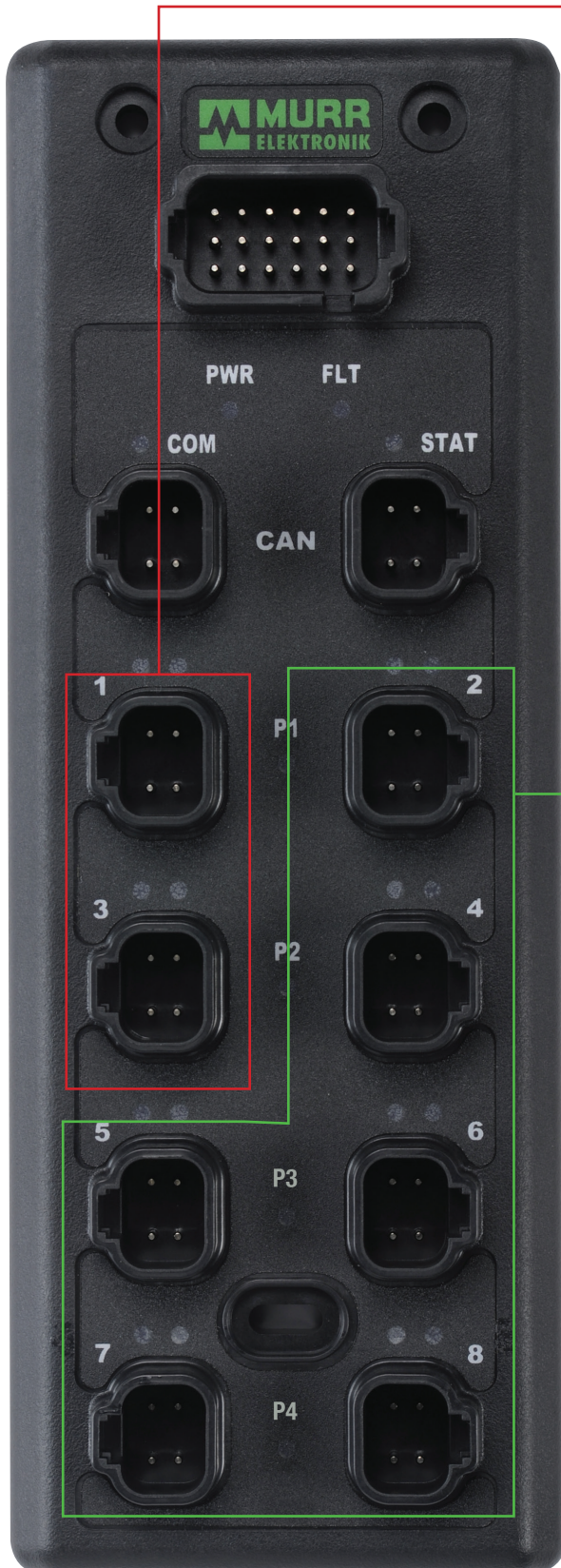


All Ground (B) connections are internally connected. All connections must be made to achieve the current rating of the block

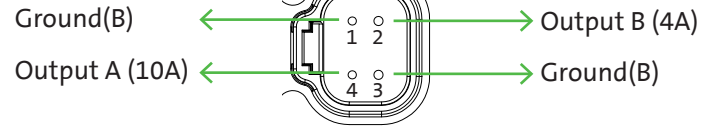


A Ground (B) connection must be made for every 13A consumed by the block

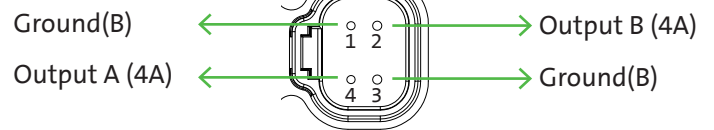
5.2.2 OUTPUT LAYOUT



Unpaired Ports



Paired Ports



Power

Pin 1 = Ground B
Pin 3 = Ground B

Configurations

Ports 2, 4-8:

1. Digital high side
2. PWM
(Only on paired outputs)
4. PWM (I) Current Controlled
(Only on paired outputs)

Ports 1,3:

1. Digital high side

Amperage

Output 1A & 3A are 10A
All other outputs = 4A

Outputs

Ports 1 & 3: Unpaired
Ports 2, 4-8: Paired

- Port 1, Pin 4: Output 1A
- Port 1, Pin 2: Output 1B
- Port 2, Pin 4: Output 2A
- Port 2, Pin 2: Output 2B
- Port 3, Pin 4: Output 3A
- Port 3, Pin 2: Output 3B
- Port 4, Pin 4: Output 4A
- Port 4, Pin 2: Output 4B
- Port 5, Pin 4: Output 5A
- Port 5, Pin 2: Output 5B
- Port 6, Pin 4: Output 6A
- Port 6, Pin 2: Output 6B
- Port 7, Pin 4: Output 7A
- Port 7, Pin 2: Output 7B
- Port 8, Pin 4: Output 8A
- Port 8, Pin 2: Output 8B



Paired outputs can't be on at the same time



All non paired outputs are discrete on/off only.



All Ground (B) connections must be made in order to achieve the total specified current.

5.2.3 CONFIGURING OUTPUTS

Output Mode

There are two ways to configure the outputs. All configuration is done through the same PGN. PGN 61408 is used for multiple messages by use of a different value put into the “command” byte of the PGN. This value is used as an index or pointer as to where the information goes in the module.

1. All Output Configuration

(only used if you want all the outputs to be configured the same)

Configuring all of the outputs is done through the “MODE1” byte in PGN 61408. The J1939 message structure,

PGN	Command Value
61408 (0xEFE0) Node offset of 0	82 (0x52)
Source Address	Transmit rate
(0x?? (CSA*))	50 ms
PDU Format	Msg timeout
239 (0xEF)	200 ms
PDU Specific	Priority
224 (0xE0)	6
Built Message	DP
(0x18EFE0??)	0

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message you're sending)
Ctrl Mode Reset	2 bit	2	1,2	Enables Controller Mode Output Reset. Enabled (01) = cycling the output will reset the fault, if (00) power cycle required for fault reset
Enable (Status Msg 1)			3,4	Enables the constant transmission of status message 1
Enable (Status Msg 2)			5,6	Enables the constant transmission of status message 2
Enable (Amp Msg)			7,8	Enable the constant transmission of amperage message
Enable 24 vdc		3	1,2	Enables the low and over voltage fault limits for 24 vdc system
Save Configuration			3,4	Saves the configuration to the module (otherwise changes only valid until a power cycle occurs), set to 1 to write configuration to module
			5,6	
			7,8	
		4	1,2	
			3,4	
			5,6	
			7,8	
FREQ1	Word	5		Sets the configuration of the frequency for all channels (30-1140 Hz) value = 0x 01-FE
		6		
MODE1	4 bit	7		Sets the configuration of ALL the outputs, overrides Command 53 and 54. (0=Mode 1 NOT USED, 1=ON/OFF, 2=Data 0-4000, 3= Percent 0-100.0%(0-1000))
MODE2	4 bit			Sets the configuration of ALL the inputs. (NOT USED ON THIS MODULE)
ID1	Byte	8		User defined byte for configuration ID, this will be transmitted in the STAT message.

* PGN is different depending on Node ID offset. See PGN's used sheet

*CSA - Controller Source Address

2. Individual Configuration

Individual output configuration is done through the “output mode” nibble in PGN 61408

PGN		Command Value
61408 (0xEFE0) Node offset of 0		83 (0x53)
Source Address	Transmit rate	
(0x?? (CSA*))	50 ms	
PDU Format	Msg timeout	
239 (0xEF)	200 ms	
PDU Specific	Priority	
224 (0xE0)	6	
Built Message	DP	
(0x18EFE0??)	0	

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message your sending)
Mode 1A	4 bit	2	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off
Mode 1B			5,6,7,8	
Mode 2A & 2B		3	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off, 0x2=Data(0-4000), 0x3=Percent(0-1000 = 0-100.0%), 0x4=Amps(0-4000 = 0-4.000 amps)
Not used			5,6,7,8	
Mode 3A		4	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off
Mode 3B			5,6,7,8	
Mode 4A & 4B		5	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off, 0x2=Data(0-4000), 0x3=Percent(0-1000 = 0-100.0%), 0x4=Amps(0-4000 = 0-4.000 amps)
Not used			5,6,7,8	
Mode 5A & 5B		6	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off, 0x2=Data(0-4000), 0x3=Percent(0-1000 = 0-100.0%), 0x4=Amps(0-4000 = 0-4.000 amps)
Not used			5,6,7,8	
Mode 6A & 6B		7	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off, 0x2=Data(0-4000), 0x3=Percent(0-1000 = 0-100.0%), 0x4=Amps(0-4000 = 0-4.000 amps)
Not used			5,6,7,8	
Mode 7A & 7B		8	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off, 0x2=Data(0-4000), 0x3=Percent(0-1000 = 0-100.0%), 0x4=Amps(0-4000 = 0-4.000 amps)
Not used			5,6,7,8	

3. Modes

Using a value of 0 - 4 will select the configuration of the output

[MODE#X]	Output Operation	Notes
0x0h	Disabled	Not Used
0x1h	ON/OFF	ON/OFF
0x2h	Data (0 – 4000)	PWMx = 12 bits 0-4000
0x3h	Percent (0% – 100.0%)	PWMx = 12 bits 0-1000
0x4h	Amps (0A – 4.000)	PWMx = 12 bits 0-4000
0xFh	Not Used	Invalid Output Configuration

* PGN is different depending on Node ID offset. See PGN's used sheet

4. High Current Output Configuration

PGN	Command Value	
61408 (0xEFE0)	88 (0x58)	
Source Address	Transmit rate	
(0x?? (CSA*))	50 ms	
PDU Format	Msg timeout	
239 (0xEF)	200 ms	
PDU Specific	Priority	
224 (0xE0)	6	
Built Message	DP	
(0x18EFE0??)	0	

Name	Data Type	Byte	Bits	Description
Command	Byte	1	All	Command for index pointer
Port 1A Output 1A (0-100)		2		Set amp range 0.0-10.0A = Data Range 0-100
Port 1A Output 1B (Not Used)		3		
Port 1A Output 2A (0-100)		4		
Port 1A Output 2B (Not Used)		5		
Port 1A Output 3A (0-100)		6		Set amp range 0.0-10.0A = Data Range 0-100
Port 1A Output 3B (Not Used)		7		
Not Used		8		

5.2.4 OUTPUT OPERATION

The output operation will be different depending on the configuration chosen for the output.

1. Disabled, MODE = 0

It is recommended to disable any outputs that aren't being used. Putting a "0" in the mode for an output disables the output and prevents it from being turned on.

2. On/Off, MODE = 1 (Used for Discrete Operation)

This puts the output into the standard discrete operation mode. The use of bit pairs in Control Message 1 of PGN 61408 will turn the output on or off.

	High Bit	Low Bit
On	0	1
Off	0	0

3. Data, MODE = 2 (Used for PWM Control using a value of 0-4000)

This puts the output into PWM control with a value of 0 - 4000 equaling 0 - 100% of the duty cycle. Two bytes are allocated for each of the PWM control messages with the first 12 bits being used for the value. The first byte and the first 4 bits of the second byte are put together for 12 bit control of the output.

Example	Second Byte				First Byte							
	Bit 4	Bit 3	Bit 2	Bit 1	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1
50%												
2000	0	1	1	1	1	1	0	1	0	0	0	0

The last two bits of the second byte are used to choose a direction for the paired outputs.

	Second Byte	
	Bit 8	Bit 7
Out "B"	0	1
Out "A"	0	0

With a value greater than zero in the PWM command and a zero in the direction bit, output A will turn on. If the direction bit is set to a one, output B will turn on.

4. Percent, MODE = 3 (Used for PWM Control using a value of 0-1000 (= 0-100.0%))

This puts the output into PWM control with a value of 0 - 1000 equaling 0 - 100.0% of the duty cycle. Two bytes are allocated for each of the PWM control messages with the first 12 bits being used for the value. The first byte and the first 4 bits of the second byte are put together for 12 bit control of the output.

Example	Second Byte				First Byte							
	Bit 4	Bit 3	Bit 2	Bit 1	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1
50%												
2000	0	1	1	1	1	1	0	1	0	0	0	0

The last two bits of the second byte are used to choose a direction for the paired outputs.

	Second Byte	
	Bit 8	Bit 7
Out "B"	0	1
Out "A"	0	0

With a value greater than zero in the PWM command and a zero in the direction bit, output A will turn on. If the direction bit is set to a one, output B will turn on.

5. Amps, MODE = 4 (Used for PWM (I) Control)

This puts the output into PWM current control with a value of 0 - 4000 equaling 0 - 4000 mA. Two bytes are allocated for each of the PWM control messages with the first 12 bits being used for the value. The first byte and the first 4 bits of the second byte are put together for 12 bit control of the output.

Example	Second Byte				First Byte							
2000mV	Bit 4	Bit 3	Bit 2	Bit 1	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1
2000	0	1	1	1	1	1	0	1	0	0	0	0

The last two bits of the second byte are used to choose a direction for the paired outputs.

	Second Byte	
	Bit 8	Bit 7
Out "B"	0	1
Out "A"	0	0

With a value greater than zero in the PWM command and a zero in the direction bit, output A will turn on. If the direction bit is set to a one, output B will turn on.

PWM (I) Commands

The PWM(I) control has more status and control commands than the standard PWM control. The module takes a setpoint for the current control and closes the loop according to the values put into the Kp and Ki. The module also sends the current reading back via a current status message. All commands and status are shown below.

A. Loop Tuning (Kp and Ki)

J1939 Output Configuration 3					
Value	Name	Data Type	Byte	Bits	Description
84 (0x54)	Command	Byte	1		Command for index pointer (which message your sending)
	Mode 8A & 8B	4 bit	2	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off, 0x2=Data(0-4000), 0x3=Percent(0-1000 = 0-100.0%), 0x4=Amps(0-4000 = 0-4.000 amps)
	Not used			5,6,7,8	
	Port 1 Kp*	Byte	3		Port 1 proportional set point (0-250 = 0-2.50, >250=0) default 100
	Port 1 Ki*		4		Port 1 integral set point (0-250 = 0-2.50, >250=0) default 100
	Port 2 Kp		5		Port 2 proportional set point (0-250 = 0-2.50, >250=0) default 100
	Port 2 Ki		6		Port 2 integral set point (0-250 = 0-2.50, >250=0) default 100
	Port 3 Kp*		7		Port 3 proportional set point (0-250 = 0-2.50, >250=0) default 100
	Port 3 Ki*		8		Port 3 integral set point (0-250 = 0-2.50, >250=0) default 100

*Not used on this module

J1939 Output Configuration 4					
Value	Name	Data Type	Byte	Bits	Description
85 (0x55)	Command	Byte	1		Command for index pointer (which message your sending)
	Port 4 Kp		2		Port 7 proportional set point (0-250 = 0-2.50, >250=0) default 100
	Port 4 Ki		3		Port 7 integral set point (0-250 = 0-2.50, >250=0) default 100
	Port 5 Kp		4		Port 8 proportional set point (0-250 = 0-2.50, >250=0) default 100
	Port 5 Ki		5		Port 8 integral setpoint set point (0-250 = 0-2.50, >250=0) default 100
	Port 6 Kp		6		
	Port 6 Ki		7		
	Not used		8		

J1939 Output Configuration 4					
Value	Name	Data Type	Byte	Bits	Description
86 (0x56)	Command	Byte	1		Command for index pointer (which message your sending)
	Port 7 Kp		2		Port 7 proportional set point (0-250 = 0-2.50, >250=0) default 100
	Port 7 Ki		3		Port 7 integral set point (0-250 = 0-2.50, >250=0) default 100
	Port 8 Kp		4		Port 8 proportional set point (0-250 = 0-2.50, >250=0) default 100
	Port 8 Ki		5		Port 8 integral setpoint set point (0-250 = 0-2.50, >250=0) default 100
	Not used		6		
	Not used		7		
	Not used		8		

B. Amperage Feedback

Status Message 4 (Ouput Amperage Feedback OUT 1A-4B)				
Name	Data Type	Byte	Bits	Description
OUT 1A AMP FEEDBACK*	Word	1		Current reading on Output 1A
		2		
OUT 1B AMP FEEDBACK	Word	3		Current reading on Output 1B, 0-4000 = 0-4.000 amps
		4		
OUT 2A AMP FEEDBACK	Word	5		Current reading on Output 2A, 0-4000 = 0-4.000 amps
		6		
OUT 2B AMP FEEDBACK	Word	7		Current reading on Output 2B, 0-4000 = 0-4.000 amps
		8		

Status Message 5 (Ouput Amperage Feedback OUT 5A-8B)				
Name	Data Type	Byte	Bits	Description
OUT 3A AMP FEEDBACK*	Word	1		Current reading on Output 3A
		2		
OUT 3B AMP FEEDBACK	Word	3		Current reading on Output 3B, 0-4000 = 0-4.000 amps
		4		
OUT 4A AMP FEEDBACK	Word	5		Current reading on Output 4A, 0-4000 = 0-4.000 amps
		6		
OUT 4B AMP FEEDBACK	Word	7		Current reading on Output 4B, 0-4000 = 0-4.000 amps
		8		

* Out 1A and 3A, 0-10,000 = 0-10,000mA

5.3 STATUS MESSAGES

5.3.1 MODULE STATUS

Status Message 1 (Software and Node Status)					
PGN	Name	Data Type	Byte	Bits	Description
(0xEF(CSA))*	Software Version	Byte	1		Version of the current software
	Software Revision		2		Revision of the current software
	Status 1	2 Bit	3	1,2	Factory Default Configuration
	Status 2			3,4	Configuration Saved (module is configured)
	Status 3			5,6	Alternate Configuration Received
	Status 4			7,8	Node Alive
	Status 5		4	1,2	Node Fault Present
	Status 6			3,4	Fault Count not Zero
	Status 7			5,6	True when Message Command = 0x58 received
	Status 8			7,8	
	Fault Code	Byte	5		Active fault code
	User ID		6		The User ID of the module configured in CTRL1 message
	Status 9	2 Bit	7	1,2	True when Message Command = 0x52 received
	Status 10			3,4	True when Message Command = 0x53 received
	Status 11			5,6	True when Message Command = 0x54 received
	Status 12			7,8	True when Message Command = 0x55 received
	Status 13		8	1,2	True when Message Command = 0x56 received
	Status 14			3,4	True when Message Command = 0x57 received
	Hardware Version	4 Bit		5,6,7,8	Version of the current hardware

* (0xEF(Controller Source Address))

This is the only PGN that uses the controller source address as it is a reply to the controller.

Configuration Status

- Factory Default = From the factory configuration
- Configuration Saved = Configuration other than factory has been saved
- Alternate Configuration Received = A configuration setting has been changed and is different than the saved configuration.
This will be on until the new configuration is saved to the module

Status Message 2 (Configuration and Output Status)					
PGN	Name	Data Type	Byte	Bits	Description
65531 (0xFFFB)	Config Pair 1	2 Bit	1	1,2	Baud rate configuration jumper is applied
	Config Pair 2			3,4	Node ID 1's configuration jumper is applied
	Config Pair 3			5,6	Node ID 2's configuration jumper is applied
	Config Pair 4			7,8	Node ID 3's configuration jumper is applied
	Config Pair 5		2	1,2	Node ID 4's configuration jumper is applied
				3,4	
				5,6	
				7,8	
	Output 1A Status		3	1,2	Status of Output 1A, (00 = off), (01 = on), (10 = fault)
	Output 1B Status			3,4	Status of Output 1B, (00 = off), (01 = on), (10 = fault)
	Output 2A Status			5,6	Status of Output 2A, (00 = off), (01 = on), (10 = fault)
	Output 2B Status			7,8	Status of Output 2B, (00 = off), (01 = on), (10 = fault)
	Output 3A Status		4	1,2	Status of Output 3A, (00 = off), (01 = on), (10 = fault)
	Output 3B Status			3,4	Status of Output 3B, (00 = off), (01 = on), (10 = fault)
	Output 4A Status			5,6	Status of Output 4A, (00 = off), (01 = on), (10 = fault)
	Output 4B Status			7,8	Status of Output 4B, (00 = off), (01 = on), (10 = fault)
	Output 5A Status		5	1,2	Status of Output 5A, (00 = off), (01 = on), (10 = fault)
	Output 5B Status			3,4	Status of Output 5B, (00 = off), (01 = on), (10 = fault)
	Output 6A Status			5,6	Status of Output 6A, (00 = off), (01 = on), (10 = fault)
	Output 6B Status			7,8	Status of Output 6B, (00 = off), (01 = on), (10 = fault)
	Output 7A Status		6	1,2	Status of Output 7A, (00 = off), (01 = on), (10 = fault)
	Output 7B Status			3,4	Status of Output 7B, (00 = off), (01 = on), (10 = fault)
	Output 8A Status			5,6	Status of Output 8A, (00 = off), (01 = on), (10 = fault)
	Output 8B Status			7,8	Status of Output 8B, (00 = off), (01 = on), (10 = fault)
	Power Buss P1		7	1,2	Status of Power Buss P1 (00 = off), (01 = on), (10 = fault)
	Power Buss P2			3,4	Status of Power Buss P2 (00 = off), (01 = on), (10 = fault)
	Power Buss P3			5,6	Status of Power Buss P3 (00 = off), (01 = on), (10 = fault)
	Power Buss P4			7,8	Status of Power Buss P4 (00 = off), (01 = on), (10 = fault)
	Save Config Counter	Byte	8		Count of how many times the configuration has been saved to the module

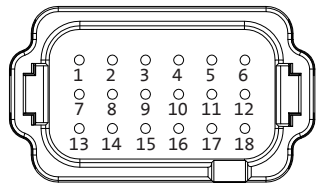
Status Message 3 (Controller Information)					
PGN	Name	Data Type	Byte	Bits	Description
65532 (0xFFFC)	CNFG1	Byte	1	All	Hardware Configuration
	CNFG2		2		PCB Assembly Revision
	VBAT	10 Bit	3		Battery Voltage
			4	1, 2	
	TEMP	12 Bit	5	All	Module Temperature
			6	1, 2, 3, 3	
	CNFG3	Byte	7	All	Additional Configuration
			8		Not Used

5.4 DATA SHEET

5.4.1 PORT CONFIGURATION

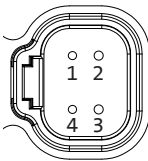


Configuration & Power Plug



See reverse for pinout guide

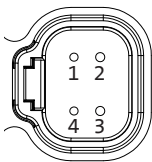
CAN Ports 1 & 2 Non-Isolated



CAN
(J1939)
Pin 2 = CAN High
Pin 4 = CAN Low

Power
(Module & Input-13A)
Pin 1 = 8-32V DC
Pin 3 = Ground (A)

Output Ports



Power
Pin 1 = Ground (B)
Pin 3 = Ground (B)

Configurations
Ports 2, 4-8:
1. Digital high side
2. PWM
(Only on paired out-puts)
4. PWM (I) Current
Controlled
(Only on paired out-puts)

Ports 1,3:
1. Digital high side

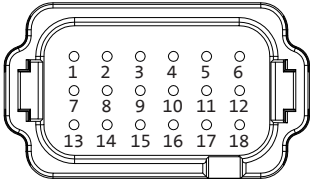
Output Current
10A = Output 1A & 3A
4A = All other outputs

Outputs
Ports 1 & 3: Unpaired
Ports 2, 4-8: Paired

- Port 1, Pin 4: Output 1A
- Port 1, Pin 2: Output 1B
- Port 2, Pin 4: Output 2A
- Port 2, Pin 2: Output 2B
- Port 3, Pin 4: Output 3A
- Port 3, Pin 2: Output 3B
- Port 4, Pin 4: Output 4A
- Port 4, Pin 2: Output 4B
- Port 5, Pin 4: Output 5A
- Port 5, Pin 2: Output 5B
- Port 6, Pin 4: Output 6A
- Port 6, Pin 2: Output 6B
- Port 7, Pin 4: Output 7A
- Port 7, Pin 2: Output 7B
- Port 8, Pin 4: Output 8A
- Port 8, Pin 2: Output 8B

Configuration & Power Plug Pinouts

Jumper from A to B to configure



Baud Rate

No Jumper = 250kb

1. Baud1-A Baud1-A to Baud1-B = 500kb
7. Baud1-B

Node ID (0-15)

2. Config1-A = 1s
8. Config1-B

3. Config2-A = 2s
9. Config2-B

4. Config3-A
10. Config3-B = 4s

5. Config4-A
11. Config4-B = 8s

Power (Output Only)

13. Power 1 = 13A for ports 1 & 2 (Outputs 1A, 1B, 2A, 2B)
14. Power 2 = 13A for ports 3 & 4 (Outputs 3A, 3B, 4A, 4B)
15. Power 3 = 13A for ports 5 & 6 (Outputs 5A, 5B, 6A, 6B)
6. Power 4 = 13A for ports 7 & 8 (Outputs 7A, 7B, 8A, 8B)

16. Ground 1B = for ports 1 & 2 (Outputs 1A, 1B, 2A, 2B)
17. Ground 2B = for ports 3 & 4 (Outputs 3A, 3B, 4A, 4B)
18. Ground 3B = for ports 5 & 6 (Outputs 5A, 5B, 6A, 6B)
12. Ground 4B = for ports 7 & 8 (Outputs 7A, 7B, 8A, 8B)

5.4.2 TECHNICAL DATA

Art. No. / Description	DP-34044-4 / Output Block w/PWM (I)
Dimension	3.802" (97.03mm) x 10.427" (264.85mm)
Installation	(3) M5 x 1 screws
Communication	2 non-isolated J1939 ports
Voltage Range	8-32V DC
Operating/Storage Temp	-40 to 85°C/-45 to 85°C
Protection	IP67
# of Ports	8
Total # of I/O	16
Total # of Outputs	16
# of Configurable Outputs	12
# of Paired Outputs	12
Output Configurations	Digital (+), PWM, PWM(I)
PWM Frequency	100-1200hz
Output Diagnostics	Short Circuit and Overcurrent
Switching Current	(2) 4A, (2) 10A, (6) 4A Paired
Total Output Current	52A
J1939 Port	1=+V DC (Module Pwr), 2=CAN L, 3=Ground A, 4=CANH
Node ID Offset	0-15 Offset
Baud Rate	250 Kbits/s, 500 Kbits/s
LEDs	5 Blue PWR, 1 Green CAN, 1 Green Stat, 1 Red Flt, 16 Yellow Status
Ports 1-8	1=Ground B, 2=Sig 2, 3=Ground B, 4=Sig 1

Port Deutsch Plugs Needed	
Power Port	DT16-18SA-K004
CAN & I/O Port	DT06-4S
Wedglock DT Series 4-pin Socket	W4S
Size 16, Solid Socket, 16 - 20 AWG	0462-201-16141
Size 16, Solid Socket, 14 AWG	0462-209-16141
Size 16, Locking Sealing Plug	114017

6. MESSAGE STRUCTURE

All PGNs are shown as module configured with no jumpers (Offset = 0)

PGN		Value
61408 (0xEFE0) <i>Node offset of 0</i>		82 (0x52)
Source Address	Transmit rate	
(0x?? (CSA*))	50 ms	
PDU Format	Msg timeout	
239 (0xEF)	200 ms	
PDU Specific	Priority	
224 (0xE0)	6	
Built Message	DP	
(0x18EFE0??)	0	

*CSA = Controller Source Address

J1939 Output Configuration 1

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message you're sending)
Ctrl Mode Reset	2 bit	2	1,2	Enables Controller Mode Output Reset. Enabled (0,1) = cycling the output will reset the fault.
Enable (Status Msg 1)			3,4	Enables the constant transmission of status message 1
Enable (Status Msg 2)			5,6	Enables the constant transmission of status message 2
Enable (Amp Msg)			7,8	Enable the constant transmission of amperage message
Enable 24 vdc		3	1,2	Enables the low and over voltage fault limits for 24 vdc system
Save Configuration			3,4	Saves the configuration to the module (otherwise changes only valid until a power cycle occurs), set to 1 to write configuration to module
			5,6	
			7,8	
		4	1,2	
			3,4	
			5,6	
			7,8	
FREQ1	Word	5	Low Byte	Sets the configuration of the frequency for all channels (30-1140 Hz) value = 0x 01-FE
		6	High Byte	
MODE1	4 bit	7		Sets the configuration of ALL the outputs, overrides Command 53 and 54. (0=Node 1 NOT USED, 1=ON/OFF, 2=Data 0-4000, 3= Percent 0-100.0%(0-1000))
MODE2				Sets the configuration of ALL the inputs. (NOT USED ON THIS MODULE)
ID1	Byte	8		User defined byte for configuration ID, this will be transimitted in the STAT message.

J1939 Output Control - Control Message 1 (Output Control)

Command Value
81 (0x51)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message you're sending)
Output1A	2 bit	2	1,2	Turns the output on when in "On/Off" Mode, (not used when using any other mode)
Output1B			3,4	
Output2A			5,6	
Output2B			7,8	
Output3A		3	1,2	
Output3B			3,4	
Output4A			5,6	
Output4B			7,8	
Output5A		4	1,2	
Output5B			3,4	
Output6A			5,6	
Output6B			7,8	
Output7A		5	1,2	
Output7B			3,4	
Output8A			5,6	
Output8B			7,8	
	Byte	6		
		7		
		8		

J1939 Output Configuration 2

Command Value
83 (0x53)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message your sending)
Mode 1A	4 bit	2	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off
Mode 1B			5,6,7,8	
Mode 2A & 2B		3	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off, 0x2=Data(0-4000), 0x3=Percent(0-1000 = 0-100.0%), 0x4=Amps(0-4000 = 0-4.000 amps)
Not used			5,6,7,8	
Mode 3A		4	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off
Mode 3B			5,6,7,8	
Mode 4A & 4B		5	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off, 0x2=Data(0-4000), 0x3=Percent(0-1000 = 0-100.0%), 0x4=Amps(0-4000 = 0-4.000 amps)
Not used			5,6,7,8	
Mode 5A & 5B		6	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off, 0x2=Data(0-4000), 0x3=Percent(0-1000 = 0-100.0%), 0x4=Amps(0-4000 = 0-4.000 amps)
Not used			5,6,7,8	
Mode 6A & 6B		7	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off, 0x2=Data(0-4000), 0x3=Percent(0-1000 = 0-100.0%), 0x4=Amps(0-4000 = 0-4.000 amps)
Not used			5,6,7,8	
Mode 7A & 7B		8	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off, 0x2=Data(0-4000), 0x3=Percent(0-1000 = 0-100.0%), 0x4=Amps(0-4000 = 0-4.000 amps)
Not used			5,6,7,8	

All PGNs are shown as module configured with no jumpers (Offset = 0)

PGN	
61408 (0xEFE0) <i>Node offset of 0</i>	
Source Address	Transmit rate
(0x?? (CSA*))	50 ms
PDU Format	Msg timeout
239 (0xEF)	200 ms
PDU Specific	Priority
224 (0xE0)	6
Built Message	DP
(0x18EFE0??)	0

J1939 Output Configuration 3

Command Value
84 (0x54)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message your sending)
Mode 8A & 8B	4 bit	2	1,2,3,4	Mode 0x0=disabled, 0x1=On/Off, 0x2=Data(0-4000), 0x3=Percent(0-1000 = 0-100.0%), 0x4=Amps(0-4000 = 0-4.000 amps)
Not used			5,6,7,8	
Port 1 Kp (not used on this module)	Byte	3		Port 1 proportional set point (0-250 = 0-2.50, >250 = 0) default 100
Port 1 Ki (not used on this module)		4		Port 1 integral set point (0-250 = 0-2.50, >250 = 0) default 100
Port 2 Kp		5		Port 2 proportional set point (0-250 = 0-2.50, >250 = 0) default 100
Port 2 Ki		6		Port 2 integral set point (0-250 = 0-2.50, >250 = 0) default 100
Port 3 Kp (not used on this module)		7		Port 3 proportional set point (0-250 = 0-2.50, >250 = 0) default 100
Port 3 Ki (not used on this module)		8	7,8	Port 3 integral set point (0-250 = 0-2.50, >250 = 0) default 100

J1939 Output Configuration 4

Command Value
85 (0x55)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message your sending)
Port 4 Kp		2		Port 4 proportional set point (0-250 = 0-2.50, >250 = 0) default 100
Port 4 Ki		3		Port 4 integral set point (0-250 = 0-2.50, >250 = 0) default 100
Port 5 Kp		4		Port 5 proportional set point (0-250 = 0-2.50, >250 = 0) default 100
Port 5 Ki		5		Port 5 integral set point (0-250 = 0-2.50, >250 = 0) default 100
Port 6 Kp		6		Port 6 proportional set point (0-250 = 0-2.50, >250 = 0) default 100
Port 6 Ki		7		Port 6 integral set point (0-250 = 0-2.50, >250 = 0) default 100
Not used		8		

J1939 Output Configuration 5

Command Value
86 (0x56)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message your sending)
Port 7 Kp		2		Port 7 proportional set point (0-250 = 0-2.50, >250 = 0) default 100
Port 7 Ki		3		Port 7 integral set point (0-250 = 0-2.50, >250 = 0) default 100
Port 8 Kp		4		Port 8 proportional set point (0-250 = 0-2.50, >250 = 0) default 100
Port 8 Ki		5		Port 8 integral set point (0-250 = 0-2.50, >250 = 0) default 100
Not used		6		
Not used		7		
Not used		8		

PGN	Command Value
61408 (0xEFE0)	88 (0x58)
Source Address (0x?? (CSA*))	Transmit rate 50 ms
PDU Format 239 (0xEF)	Msg timeout 200 ms
PDU Specific 224 (0xE0)	Priority 6
Built Message (0x18EFE0??)	DP 0

Name	Data Type	Byte	Bits	Description
Command	Byte	1	All	Command for index pointer
Port 1A Output 1A (0-100)		2		Set amp range 0.0-10.0A = Data Range 0-100
Port 1A Output 1B (Not Used)		3		
Port 1A Output 2A (0-100)		4		
Port 1A Output 2B (Not Used)		5		
Port 1A Output 3A (0-100)		6		Set amp range 0.0-10.0A = Data Range 0-100
Port 1A Output 3B (Not Used)		7		
Not Used		8		

Control Message 2 (PWM1)

PGN	
65308 (0xFF1C) <i>Node offset of 0</i>	
Source Address	Transmit rate
(0x?? (CSA*))	50 ms
PDU Format	Msg timeout
255 (0xEF)	200 ms
PDU Specific	Priority
28 (0x1C)	3
Built Message	DP
(0x12FF1C??)	0

Name	Data Type	Byte	Bits	Description
PWM Ctrl Output 1A & 1B	12 Bit	1	All	PWM Output 1A & 1B, Byte 1 (12 bit, uses the 1st byte and the first 4 bits of the 2nd byte)
		2	1, 2, 3, 4	
	2 Bit		7,8	PWM Output 1A & 1B Direction Bit (00=Port2A, 01=Port2B, 10=Not used, 11=Not used)
PWM Ctrl Output 2A & 2B	12 Bit	3	All	PWM Output 1A & 1B, Byte 1 (12 bit, uses the 1st byte and the first 4 bits of the 2nd byte)
		4	1, 2, 3, 4	
	2 Bit		7,8	PWM Output 2A & 2B Direction Bit (00=Port2A, 01=Port2B, 10=Not used, 11=Not used)
PWM Ctrl Output 3A & 3B	12 Bit	5	All	PWM Output 3A & 3B, Byte 1 (12 bit, uses the 1st byte and the first 4 bits of the 2nd byte)
		6	1, 2, 3, 4	
	2 Bit		7,8	PWM Output 3A & 3B Direction Bit (00=Port5A, 01=Port5B, 10=Not used, 11=Not used)
PWM Ctrl Output 4A & 4B	12 Bit	7	All	PWM Output 4A & 4B, Byte 1 (12 bit, uses the 1st byte and the first 4 bits of the 2nd byte)
		8	1, 2, 3, 4	
	2 Bit		7,8	PWM Output 4A & 4B Direction Bit (00=Port4A, 01=Port4B, 10=Not used, 11=Not used)

All PGNs are shown as module configured with no jumpers (Offset = 0)

Control Message 3 (PWM2)

PGN	
65309 (0xFF1D) <i>Node offset of 0</i>	
Source Address	Transmit rate
(0x?? (CSA*))	50 ms
PDU Format	Msg timeout
255 (0xEF)	200 ms
PDU Specific	Priority
29 (0x1D)	3
Built Message	DP
(0x18FF1D??)	0

Name	Data Type	Byte	Bits	Description
PWM Ctrl Output 5A & 5B	12 Bit	1	All	PWM Output 5A & 5B, Byte 1 (12 bit, uses the 1st byte and the first 4 bits of the 2nd byte)
		2	1, 2, 3, 4	
	2 Bit		7,8	PWM Output 5A & 5B Direction Bit (00=Port5A, 01=Port5B, 10=Not used, 11=Not used)
PWM Ctrl Output 6A & 6B	12 Bit	3	All	PWM Output 6A & 6B, Byte 1 (12 bit, uses the 1st byte and the first 4 bits of the 2nd byte)
		4	1, 2, 3, 4	
	2 Bit		7,8	PWM Output 6A & 6B Direction Bit (00=Port6A, 01=Port6B, 10=Not used, 11=Not used)
PWM Ctrl Output 7A & 7B	12 Bit	5	All	PWM Output 7A & 7B, Byte 1 (12 bit, uses the 1st byte and the first 4 bits of the 2nd byte)
		6	1, 2, 3, 4	
	2 Bit		7,8	PWM Output 7A & 7B Sign Bit (00=Port7A, 01=Port7B, 10=Not used, 11=Not used)
PWM Ctrl Output 8A & 8B	12 Bit	7	All	PWM Output 8A & 8B, Byte 1 (12 bit, uses the 1st byte and the first 4 bits of the 2nd byte)
		8	1, 2, 3, 4	
	2 Bit		7,8	PWM Output 8A & 8B Sign Bit (00=Port8A, 01=Port8B, 10=Not used, 11=Not used)

Status Message 1 (Software and Node Status)

PGN	
(0xEF(CSA))	
Source Address	Transmit rate
224 (0xE0) <i>Node offset of 0</i>	50 ms
PDU Format	Msg timeout
239 (0xEF)	200 ms
PDU Specific	Priority
(0x??(CSA))	6
Built Message	DP
(0x18FF??E0)	0

Name	Data Type	Byte	Bits	Description
Software Version	Byte	1		Version of the current software
Software Revision		2		Revision of the current software
Status 1	2 Bit	3	1,2	Factory Default Configuration
Status 2			3,4	Configuration Saved (module is configured)
Status 3			5,6	Alternate Configuration Received
Status 4			7,8	Node Alive
Status 5		4	1,2	Node Fault Present
Status 6			3,4	Fault Count not Zero
Status 7			5,6	True when Message Command = 0x58 received
Status 8			7,8	
Fault Code	Byte	5		Active fault code
User ID		6		The User ID of the module configured in CTRL1 message
Status 9	2 Bit	7	1,2	True when Message Command = 0x52 received
Status 10			3,4	True when Message Command = 0x53 received
Status 11			5,6	True when Message Command = 0x54 received
Status 12			7,8	True when Message Command = 0x55 received
Status 13		8	1,2	True when Message Command = 0x56 received
Status 14			3,4	True when Message Command = 0x57 received
Hardware Version			5,6,7,8	Version of the current hardware

All source addresses are shown as module configured with no jumpers (Offset = 0)

Status Message 2 (Configuration and Output Status)

PGN	
65531 (0xFFFB)	
Source Address	Transmit rate
224 (0xE0) <i>Node offset of 0</i>	50 ms
PDU Format	Msg timeout
255 (0xFF)	200 ms
PDU Specific	Priority
251 (0xFB)	6
Built Message	DP
(0x18FFFBEO)	0

Name	Data Type	Byte	Bits	Description
Config Pair 1	2 Bit	1	1,2	Baud rate configuration jumper is applied
Config Pair 2			3,4	Node ID 1's configuration jumper is applied
Config Pair 3			5,6	Node ID 2's configuration jumper is applied
Config Pair 4			7,8	Node ID 3's configuration jumper is applied
Config Pair 5				
		2	1,2	Node ID 4's configuration jumper is applied
			3,4	
			5,6	
			7,8	
Output 1A Status		3	1,2	Status of Output 1A, (00 = off), (01 = on), (10 = fault)
Output 1B Status			3,4	Status of Output 1B, (00 = off), (01 = on), (10 = fault)
Output 2A Status			5,6	Status of Output 2A, (00 = off), (01 = on), (10 = fault)
Output 2B Status			7,8	Status of Output 2B, (00 = off), (01 = on), (10 = fault)
Output 3A Status		4	1,2	Status of Output 3A, (00 = off), (01 = on), (10 = fault)
Output 3B Status			3,4	Status of Output 3B, (00 = off), (01 = on), (10 = fault)
Output 4A Status			5,6	Status of Output 4A, (00 = off), (01 = on), (10 = fault)
Output 4B Status			7,8	Status of Output 4B, (00 = off), (01 = on), (10 = fault)
Output 5A Status		5	1,2	Status of Output 5A, (00 = off), (01 = on), (10 = fault)
Output 5B Status			3,4	Status of Output 5B, (00 = off), (01 = on), (10 = fault)
Output 6A Status			5,6	Status of Output 6A, (00 = off), (01 = on), (10 = fault)
Output 6B Status			7,8	Status of Output 6B, (00 = off), (01 = on), (10 = fault)
Output 7A Status		6	1,2	Status of Output 7A, (00 = off), (01 = on), (10 = fault)
Output 7B Status			3,4	Status of Output 7B, (00 = off), (01 = on), (10 = fault)
Output 8A Status			5,6	Status of Output 8A, (00 = off), (01 = on), (10 = fault)
Output 8B Status			7,8	Status of Output 8B, (00 = off), (01 = on), (10 = fault)
Power Buss P1		7	1,2	Status of Power Buss P1 (00 = off), (01 = on), (10 = fault)
Power Buss P2			3,4	Status of Power Buss P2 (00 = off), (01 = on), (10 = fault)
Power Buss P3			5,6	Status of Power Buss P3 (00 = off), (01 = on), (10 = fault)
Power Buss P4			7,8	Status of Power Buss P4 (00 = off), (01 = on), (10 = fault)
Save Config Counter	Byte	8		Count of how many times the configuration has been saved to the module

Status Message 3 (Controller Information)

PGN	
65532 (0xFFFC)	
Source Address	Transmit rate
224 (0xE0) <i>Node offset of 0</i>	50 ms
PDU Format	Msg timeout
255 (0xFF)	200 ms
PDU Specific	Priority
252 (0xFC)	6
Built Message	DP
(0x18FFCE0)	0

Name	Data Type	Byte	Bits	Description
CNFG1	Byte	1	All	Hardware Configuration
CNFG2		2		PCB Assembly Revision
VBAT	10 Bit	3		Battery Voltage
		4	1, 2	
TEMP	12 Bit	5	All	Module Temperature
		6	1, 2, 3, 3	
CNFG3	Byte	7	All	Additional Configuration
		8		Not Used

Status Message 4 (Output Amperage Feedback Port 1-4)

PGN	
65532 (0xFF3)	
Source Address	Transmit rate
224 (0xE0) <i>Node offset of 0</i>	50 ms
PDU Format	Msg timeout
255 (0xFF)	200 ms
PDU Specific	Priority
243 (0xF3)	6
Built Message	DP
(0x18FFF3E0)	0

Name	Data Type	Byte	Bits	Description
PORT 1 AMP FEEDBACK	Word	1		Not used on this module, discrete outputs shown in stat msg 6
		2		
PORT 2 AMP FEEDBACK		3		Current reading on Port 2 Outputs, 0-4,000=0-4,000A
		4		
PORT 3 AMP FEEDBACK		5		Not used on this module, discrete outputs shown in stat msg 6
		6		
PORT 4 AMP FEEDBACK		7		Current reading on Port 4 Outputs, 0-4,000=0-4,000A
		8		

All addresses are shown as module configured with no jumpers (Offset = 0)

Status Message 5 (Output Amperage Feedback Port 5 -8)

PGN 5	
65524 (0xFF4)	
Source Address	Transmit rate
224 (0xE0) <i>Node offset of 0</i>	50 ms
PDU Format	Msg timeout
255 (0xFF)	200 ms
PDU Specific	Priority
243 (0xF4)	6
Built Message	DP
(0x18FF4E0)	0

Name	Data Type	Byte	Bits	Description
PORT 5 AMP FEEDBACK	Word	1		Current reading on Port 5 Outputs, 1mA per bit
		2		
PORT 6 AMP FEEDBACK		3		Current reading on Port 6 Outputs, 1mA per bit
		4		
PORT 7 AMP FEEDBACK		5		Current reading on Port 7 Outputs, 1mA per bit
		6		
PORT 8 AMP FEEDBACK		7		Current reading on Port 8 Outputs, 1mA per bit
		8		

0-4,000=0-4,000A

Status Message 6 (Output Amperage Feedback Port 1,3)

PGN 6	
65533 (0xFFD)	
Source Address	Transmit rate
224 (0xE0) <i>Node offset of 0</i>	50 ms
PDU Format	Msg timeout
255 (0xFF)	200 ms
PDU Specific	Priority
253 (0xFD)	6
Built Message	DP
(0x18FFDE0)	0

Name	Data Type	Byte	Bits	Description
OUT 1A AMP FEEDBACK	Word	1		Current reading on Port 1A, 1mA per bit
		2		
OUT 1B AMP FEEDBACK		3		Current reading on Port 1B, 1mA per bit
		4		
OUT 3A AMP FEEDBACK		5		Current reading on Port 3A, 1mA per bit
		6		
OUT 3B AMP FEEDBACK		7		Current reading on Port 3B, 1mA per bit
		8		

0-4,000=0-4,000A

7. PGNs USED

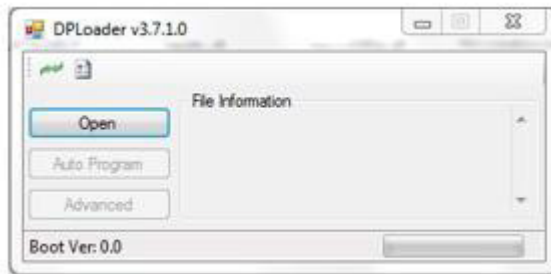
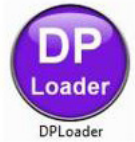
Depending on the Node ID selected for the module, the PGNs and source address will be different for the module. The section below shows which are used for each Node ID.

Node ID	Control	PWM1	PWM2	Module Status	Output Status	Analog Status	Amp Data 1, 3	Amp Data 2,4	Amp Data 5-8	Fault Count
0	EFE0	FF1C	FF1D	(EF(CSA)) (SA=E0)	FFFB (SA=E0)	FFFC (SA=E0)	FFFD (SA=E0)	FFF3 (SA=E0)	FFF4 (SA=E0)	FFE6 (SA=E0)
1	EFE1	FF20	FF21	(EF(CSA)) (SA=E1)	FFFB (SA=E1)	FFFC (SA=E1)	FFFD (SA=E1)	FFF3 (SA=E1)	FFF4 (SA=E1)	FFE6 (SA=E1)
2	EFE2	FF24	FF25	(EF(CSA)) (SA=E2)	FFFB (SA=E2)	FFFC (SA=E2)	FFFD (SA=E2)	FFF3 (SA=E2)	FFF4 (SA=E2)	FFE6 (SA=E2)
3	EFE3	FF28	FF29	(EF(CSA)) (SA=E3)	FFFB (SA=E3)	FFFC (SA=E3)	FFFD (SA=E3)	FFF3 (SA=E3)	FFF4 (SA=E3)	FFE6 (SA=E3)
4	EFE4	FF2C	FF2D	(EF(CSA)) (SA=E4)	FFFB (SA=E4)	FFFC (SA=E4)	FFFD (SA=E4)	FFF3 (SA=E4)	FFF4 (SA=E4)	FFE6 (SA=E4)
5	EFE5	FF30	FF31	(EF(CSA)) (SA=E5)	FFFB (SA=E5)	FFFC (SA=E5)	FFFD (SA=E5)	FFF3 (SA=E5)	FFF4 (SA=E5)	FFE6 (SA=E5)
6	EFE6	FF34	FF35	(EF(CSA)) (SA=E6)	FFFB (SA=E6)	FFFC (SA=E6)	FFFD (SA=E6)	FFF3 (SA=E6)	FFF4 (SA=E6)	FFE6 (SA=E6)
7	EFE7	FF38	FF39	(EF(CSA)) (SA=E7)	FFFB (SA=E7)	FFFC (SA=E7)	FFFD (SA=E7)	FFF3 (SA=E7)	FFF4 (SA=E7)	FFE6 (SA=E7)
8	EFE8	FF3C	FF3D	(EF(CSA)) (SA=E8)	FFFB (SA=E8)	FFFC (SA=E8)	FFFD (SA=E8)	FFF3 (SA=E8)	FFF4 (SA=E8)	FFE6 (SA=E8)
9	EFE9	FF40	FF41	(EF(CSA)) (SA=E9)	FFFB (SA=E9)	FFFC (SA=E9)	FFFD (SA=E9)	FFF3 (SA=E9)	FFF4 (SA=E9)	FFE6 (SA=E9)
10	EFEA	FF44	FF45	(EF(CSA)) (SA=EA)	FFFB (SA=EA)	FFFC (SA=EA)	FFFD (SA=EA)	FFF3 (SA=EA)	FFF4 (SA=EA)	FFE6 (SA=EA)
11	EFEB	FF48	FF49	(EF(CSA)) (SA=EB)	FFFB (SA=EB)	FFFC (SA=EB)	FFFD (SA=EB)	FFF3 (SA=EB)	FFF4 (SA=EB)	FFE6 (SA=EB)
12	EFEC	FF4C	FF4D	(EF(CSA)) (SA=EC)	FFFB (SA=EC)	FFFC (SA=EC)	FFFD (SA=EC)	FFF3 (SA=EC)	FFF4 (SA=EC)	FFE6 (SA=EC)
13	EFED	FF50	FF51	(EF(CSA)) (SA=ED)	FFFB (SA=ED)	FFFC (SA=ED)	FFFD (SA=ED)	FFF3 (SA=ED)	FFF4 (SA=ED)	FFE6 (SA=ED)
14	EFEE	FF54	FF55	(EF(CSA)) (SA=EE)	FFFB (SA=EE)	FFFC (SA=EE)	FFFD (SA=EE)	FFF3 (SA=EE)	FFF4 (SA=EE)	FFE6 (SA=EE)
15	EFFF	FF58	FF59	(EF(CSA)) (SA=EF)	FFFB (SA=EF)	FFFC (SA=EF)	FFFD (SA=EF)	FFF3 (SA=EF)	FFF4 (SA=EF)	FFE6 (SA=EF)

*SA = CSA (Controller Source Address)

8. FIRMWARE UPDATES

All modules are capable of in the field firmware updates with the use of the xtreme DB Programming Kit (DP-34005-12). DP Loader is the software used to download the firmware to the xtreme DB blocks. Please reference the DP Loader User Manual for instructions.





stay connected

1327 Northbrook Parkway, Suite 460 | Suwanee, GA 30024
P: 770-497-9292 | F: 770-497-9391 | murrinc.com