

Process Control Modules for JVL MAC Motors. MAC00-P5 and MAC00-P4

The MAC00-P4 and MAC00-P5 are expansion modules for the integrated servo motors MAC400 and up to MAC3000.

The modules are intended to be used for control application requiring an analogue 4-20mA, 16bit interface to a master controller.

The interface consists of a 4-20mA input to control the motor position and a 4-20mA output to indicate the actual position. Both offers full galvanic isolation from other electrical circuitries inside the motor and also in between.

An output is also available to indicate if any error has occurred that prevent the motor from doing the intended operation. This output is also galvanically isolated.

If a second motor need to function as a slave, the MAC00-P4/P5 modules also offer this possibility.

A high speed communication interface makes it possible to handle a secondary motor configured as "slave" which means that the communication protocol always makes sure that the slave follows the master motor. In case of an error in either the slave or master any further motion is stopped in both motors.

The modules contain no intelligence (microprocessor) meaning that all functionality is controlled via the basic motor where the module is inserted. The MAC00-P4/P5 expansion modules offer an industrial interface and a number of feature enhancements, including:



- Standard M12 and Harting connectors. (MAC00-P5) for optimum reliability.
- Standard M12 connectors. (MAC00-P4)
- 4-20mA analogue input. Resolution 16 bit (65535 steps). Galvanically isolated.
- 4-20mA analogue output. Resolution 16 bit (65535 steps). Galvanically isolated.
- Error output. Galvanically isolated.
- Modbus interface
- Communication interface to slave motor (includes +24V power to the



- slave motor)
- Optically isolated communication covering RS232, RS485.
- Full RS232 protocol support for use with standard serial cable.
- RS232 Communication interface to a PC for setup and monitoring use.
- Supply input for the control section in the motor. Is also used to the slave motor if present.



MAC800 with Module MAC00-P5 on linear guide for fuel injection control system



MAC800 with Module MAC00-P5 for control of industrial valve

Pin Connections

"CNT"- Control I/O M12 12pin female connector – Only MAC00-P4				
Signal name	Description	Pin no.	JVL Cable WI1009 -M12M12T05N	Isolation group
AIN-	4-20mA input. Negative terminal	1	Brown	2
AOUT2	4-20mA output. Negative terminal.	2	Blue	3
AIN+	4-20mA input. Positive terminal	3	White	2
OUT2	Output 2. PNP output.	4	Green	1
IN2 / AIN1	General digital input and analogue input 1 Notice that analogue input 1 is used for Zero search	5	Pink	0
OUT1	Output 1 - Default : Error output. PNP output.	6	Yellow	1
IN4	General digital input	7	Black	0
IN3 / AIN2	General digital input and analogue input 2	8	Grey	0
AOUT1	4-20mA output. Positive terminal. Apply 7 to 24V to this terminal if internal AOUT supply is disabled.	9	Red	3
P-	Main ground to be used with CVI1 and IN2-4.	10	Violet	0
O+	Supply term. to the OUT1 and 2 circuitry. Apply 5 - 32VDC	11	Grey/Pink	1
CVI1	Control supply input +12-28VDC. Consumption typical 350mA @ 24 VDC and 700mA @24VDC if a slave motor is connected. At MAC00-P4 the CVI1 is hard-wired to the CVI terminal (pin 4) at the power connector. At MAC00-P5 the CVI1 is not present but CVI1 is internally hardwired to P+	12	Red/Blue	0

"PWR" M12 5pin male connector. Only MAC00-P4				
Signal name	Description	Pin no.	JVL Cable I1000- M12F5T05N	Isolation group
P+	Main supply +12-48VDC. Connect with pin 2 *	1	Brown	1
P+	Main supply +12-48VDC. Connect with pin 1 *	2	White	1
P-	Main supply ground. Connect with pin 5 *	3	Blue	1
CVI	Output supply / Control voltage +12-32VDC.	4	Black	1
P-	Main supply ground. Connect with pin 3 *	5	Grey	1

* Note: P+ and P- are each available at 2 terminals. Make sure that both terminals are connected in order to split the supply current in 2 terminals and thereby avoid an overload of the connector.

Expansion module MAC00-P4 front plate

CNT

Basic I/O's
M12 - 12pin female connector including:
4-20mA in- and out and 2 outputs and 2 analogue inputs

COM

Communication
M12 - 5pin female connector including:
RS232 and Slave RS485 interface *



TT1195GB

PWR

Power supply
M12 - 5pin male connector including:
P+ (supply), and CVI1 (output supply) and P-

SLV

Slave Connector
M12 - 5pin male connector including:
RS485 and CVI2 supply for the slave motor.

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Expansion module MAC00-P5 front plate

Control I/O (CNT)

Harting 3HAN 8pin male
Contains
- 4-20mA input
- 4-20mA output
- Error output
- 24VDC supply input



Slave connection (SLV)

M12 - 5pin male
connector includes:
- RS485 modbus
- 24VDC to slave

Communication (COM)

M12 - 5pin female
connector includes:
- RS232 interface
- RS485 Modbus (same as SLV)

"CNT" - Control I/O. Harting 3HAN-8-pin male connector - Only MAC00-P5

Signal name	Description	Pin no.	JVL Cable WG1105	Isolation group*
AIN+	4-20mA input. Positive terminal	1	Blue	2
AIN-	4-20mA input. Negative terminal	2	Red	2
AOUT+	4-20 mA output. Positive terminal. Apply 7 to 24V to this terminal if internal AOUT supply is disabled.	3	Grey	3
AOUT-	4-20mA output. Negative terminal.	4	Yellow	3
O+	Supply term. to the error output. Apply 24VDC.	5	Green	1
OUT1	Error output. PNP output.	6	Brown	1
P+ (CVI1)	Control supply input +12-28VDC. Consumption typically 350mA@24VDC and 700mA@24VDC if a slave motor is connected. At MAC00-P5 the CVI1 is not present but CVI1 is internally hardwired to P+.	7	White	0
P-	Main ground to be used with CVI1 and CVI2.	8	Black	0

* Note: Isolation group indicate which terminals/circuits that a galvanic connected to each other. In other words group 1, 2, 3 and 4 are all fully independantly isolated from each other. Group 0 correspond to the housing of the motor which may also be connected to earth via the 115/230VAC power inlet.

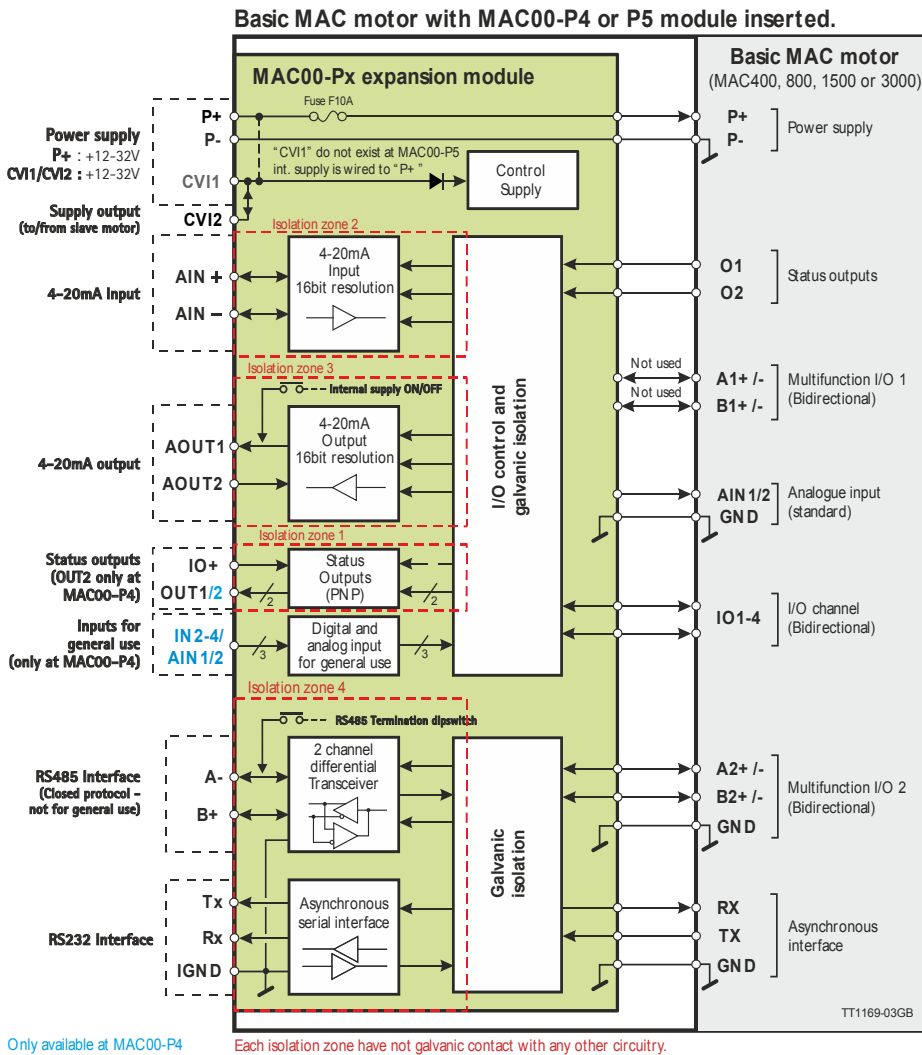
"COM" Communication connector-M12-5pin female connector MAC00-P5 and MAC00-P4

Signal name	Description	Pin no.	JVL Cable RS232-M12-1-5-5	Isolation group
RS232:RX	RS232 interface. Receive terminal. Leave open if unused.	1	Brown	4
RS232:TX	RS232 interface. Transmit terminal. Leave open if unused.	2	Whitw	4
RS485: A-	RS485 interface. Leave open if unused.	3	Blue	4
RS485: B+	RS485 interface. Leave open if unused.	4	Black	4
IGND	Ground intended to be used together with the other signals in the connector.	5	Grey	4

"SLV"-Slave connector-M12-5pin male connector MAC00-P5 and MAC00-P4

Signal name	Description	Pin no.	JVL Cable WI1005-M12F5TF5T03P	Isolation group
RS485: A-	RS485 Modbus. Positive data signal.	1	1	4
CVI2	Supply output (optionally input) +12-28VDC. Hardwired internally to CVI1	2	2	0
GND	Ground to be used with CVI2. This ground is hardwired internally to the main power ground P-.	3	3	0
RS485: B+	RS485 Modbus. Negative data signal.	4	4	4
IGND	Ground intended to be used together with the other signals in the connector.	5	Screen wire	4

Block Diagram



Specifications

Analogue In/Output	16bit/65535 steps
P+	+12-32VDC
CVI	+12-32VDC
IO+	5-32VDC
RS232	9.6kbit - 230.4kbit
RS485 (Modbus)	9.6kbit - 1 Mbit

Accessories

RS232-M12-1-5-5	RS232 Interface Cable. Length 5m.
WI1005-M12F5TF5T03P	Master to slave communication cable for synchronization. Length 3m.
WI1000-M12F5T05N	M12 Cable for power supply. Female 5 pin. Length 5m.
WG1105	Pwr/I/O Cable with Harting connector. Length 5m.



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