

Databank - Technical Bulletin

Connecting an Omron MC402 motion controller to an MR-J3

This document details how to connect a Mitsubishi MR-J3 servo amplifier to an Omron MC402 motion controller using the C200HW-MC402-UK Din Rail Mounted interface module.

Each servo is connected via a 15 way D type connector on the C200HW-MC402-UK.

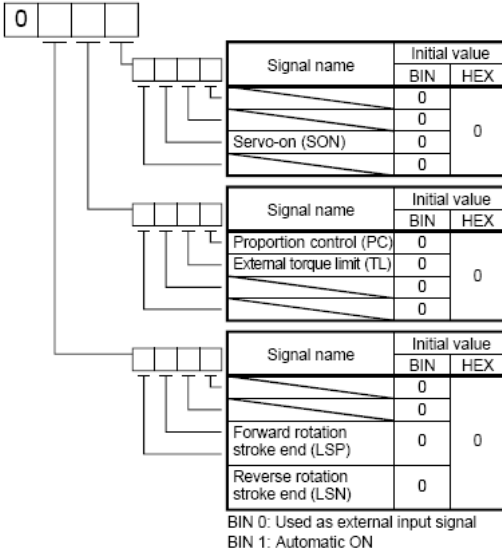
| Pin No on C200HW-MC402-UK | Description | Pin Number on Mr-J3 CN1 | Description |
|---------------------------|---|-------------------------|-------------|
| 1 | Drive 0 volts | 46 | DOCOM |
| 2 | Alarm Output from the drive | 48 | AL |
| 3 | Alarm reset to the drive | 19 | RST |
| 4 | 0V Encoder | 34 | LG |
| 5 | A_Step : A phase of the encoder input | 4 | LA |
| 6 | B_Dir : B phase of the encoder input | 6 | LB |
| 7 | Z_BST: Z Phase of the encoder | 8 | LZ |
| 8 | V+: Positive side of the +/- 10V speed command output | 2 | VC |
| 9 | 24V_DRV: drive 24 volt supply | 20 | PICOM |
| 10 | ENABLE: Drive enable Signal | 15 & 17 | SON & ST1 |
| 11 | 5V_Encoder: 5V signal going to an encoder (if required) | | |
| 12 | /A_Step: Complement of the A phase | 5 | LAR |
| 13 | /B_Dir: Complement of the B phase | 7 | LBR |
| 14 | /Z_BST: Complement of the Z phase | 9 | LBZ |
| 15 | V-: Common side of the +/-10V Speed command signal | 28 | LG |

On the Mitsubishi MR-J3 CN1 also link out and 42(EMG) to 47(DOCOM) to disable the force stop input.

Set Parameter PA01 to 0002 for speed mode.

To disable the MR-J3 limits use PD01(DIA1), 0C00. For this parameter to take effect the servo need power cycling.

Databank - Technical Bulletin

| No. | Symbol | Name and Function | Initial Value | Unit | Setting Range | Control Mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|--------|---|---------------|------|---------------|--------------|-------|--------|-----|-----|--|--|---|---|--|--|---|----------------|--|---|--|--|---|-------------|--|---------------|--|--|--|---|---|--|--|---|-------------------------|--|---|----------------------------|--|---|-------------|--|---------------|--|--|--|---|---|--|--|---|-----------------------------------|--|---|-----------------------------------|--|---|-------|--|---------------------------------------|---|---|---|
| | | | | | | Position | Speed | Torque | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PD01 | *DIA1 | Input signal automatic ON selection 1 Select the input devices to be automatically turned ON.  <table border="1" style="margin-top: 10px; font-size: small;"> <thead> <tr> <th colspan="2">Signal name</th> <th colspan="2">Initial value</th> </tr> <tr> <th></th> <th></th> <th>BIN</th> <th>HEX</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>0</td> <td rowspan="4">0</td> </tr> <tr> <td></td> <td></td> <td>0</td> </tr> <tr> <td>Servo-on (SON)</td> <td></td> <td>0</td> </tr> <tr> <td></td> <td></td> <td>0</td> </tr> <tr> <td colspan="2">Signal name</td> <td colspan="2">Initial value</td> </tr> <tr> <td></td> <td></td> <td>0</td> <td rowspan="4">0</td> </tr> <tr> <td></td> <td></td> <td>0</td> </tr> <tr> <td>Proportion control (PC)</td> <td></td> <td>0</td> </tr> <tr> <td>External torque limit (TL)</td> <td></td> <td>0</td> </tr> <tr> <td colspan="2">Signal name</td> <td colspan="2">Initial value</td> </tr> <tr> <td></td> <td></td> <td>0</td> <td rowspan="4">0</td> </tr> <tr> <td></td> <td></td> <td>0</td> </tr> <tr> <td>Forward rotation stroke end (LSP)</td> <td></td> <td>0</td> </tr> <tr> <td>Reverse rotation stroke end (LSN)</td> <td></td> <td>0</td> </tr> </tbody> </table> <p style="font-size: x-small; margin-top: 5px;">BIN 0: Used as external input signal BIN 1: Automatic ON</p> <p style="font-size: x-small; margin-top: 5px;">For example, to turn ON SON, the setting is "□□□4".</p> | Signal name | | Initial value | | | | BIN | HEX | | | 0 | 0 | | | 0 | Servo-on (SON) | | 0 | | | 0 | Signal name | | Initial value | | | | 0 | 0 | | | 0 | Proportion control (PC) | | 0 | External torque limit (TL) | | 0 | Signal name | | Initial value | | | | 0 | 0 | | | 0 | Forward rotation stroke end (LSP) | | 0 | Reverse rotation stroke end (LSN) | | 0 | 0000h | | Refer to the Name and Function field. | ○ | ○ | ○ |
| Signal name | | Initial value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | BIN | HEX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Servo-on (SON) | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Signal name | | Initial value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Proportion control (PC) | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| External torque limit (TL) | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Signal name | | Initial value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Forward rotation stroke end (LSP) | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reverse rotation stroke end (LSN) | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

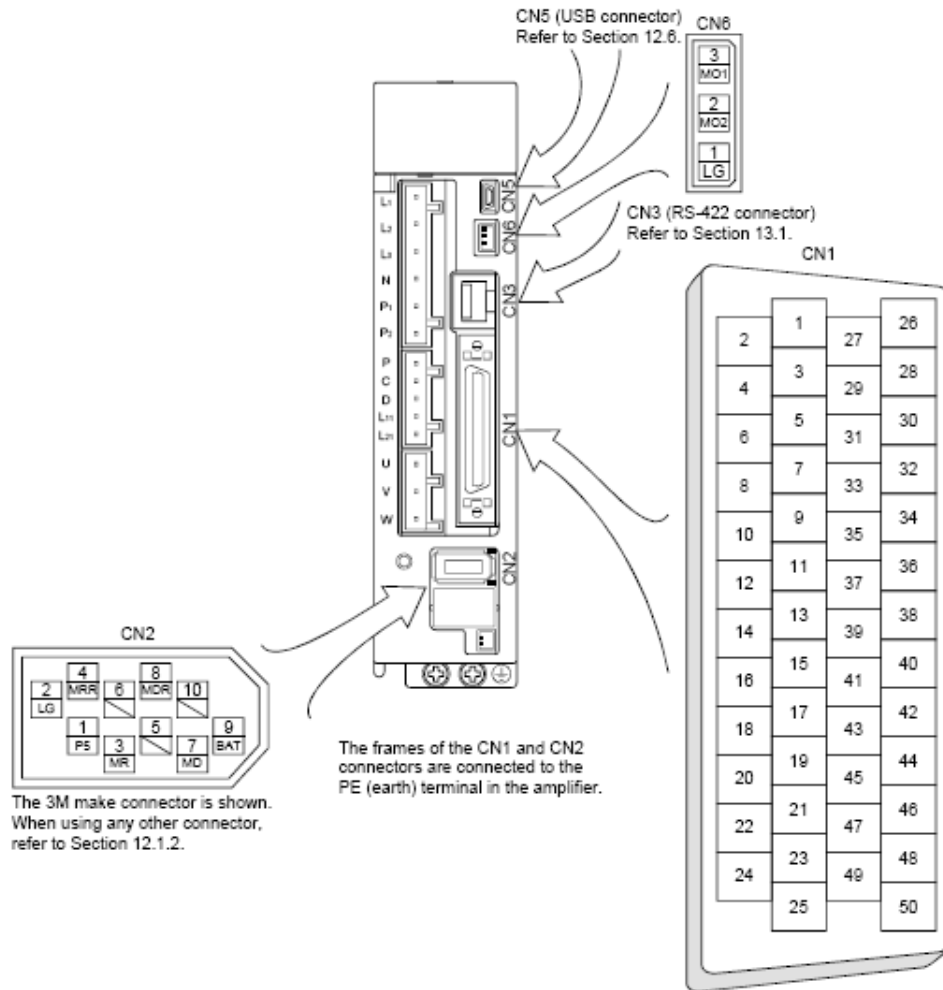
3) A login to the web site is now requested, if not already registered select the 'Register now' option.

Issued by: Mitsubishi Electric Europe B.V. - UK Branch
 Document issue: **Ver March 2007**
 Produced by: - CTC
 Travellers Lane, Hatfield, Herts, AL10 8XB, UK
 Author: Barry Weller

Databank - Technical Bulletin

(1) Signal arrangement

The servo amplifier front view shown is that of the MR-J3-20A or less. Refer to Chapter 10 Outline Drawings for the appearances and connector layouts of the other servo amplifiers.



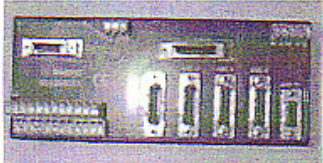
Issued by: Mitsubishi Electric Europe B.V. - UK Branch
 Document issue: **Ver March 2007**
 Produced by: - CTC
 Travellers Lane, Hatfield, Herts, AL10 8XB, UK
 Author: Barry Weller

Databank - Technical Bulletin

Model
60.220.603.S
C200HW-MC402-UK Din Rail Mounted Interface Module

INSTRUCTION SHEET

Thank you for purchasing the 60.220.603.S product. Read this instruction sheet thoroughly and familiarise yourself with the functions and characteristics of the product before using it. To ensure safe and correct use of this Unit, also read the accompanying manual (Cat. No.MC402 Operation Manual): C200HW-MC402 Motion Control Unit Operation Manual

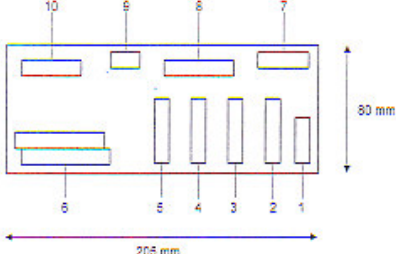


Keep this instruction sheet for future reference.
 OMRON Electronics Ltd.
 © OMRON Electronics Ltd 1999 All Rights Reserved

⚠ DANGER Do not attempt to take the Unit apart and do not touch any internal parts while the power is being supplied. Doing either of these may result in electrical shock, and serious or fatal injury.

■ Unit specifications

This unit is manufactured by Wieland Electric Ltd specifically for the C200HW-MC402-UK to facilitate connections between the motion control unit, the Drives and the MC402 I/O signals. The unit is designed to work with 0-24V signals. The table below shows the various items on the unit.



| Item | Description |
|------|---|
| 1 | Axis 0 Auxiliary Encoder Output (9 Way D-Type female) |
| 2 | Axis 0 (15 Way D-Type female) |
| 3 | Axis 1 (15 Way D-Type female) |
| 4 | Axis 2 (15 Way D-Type female) |
| 5 | Axis 3 (15 Way D-Type female) |
| 6 | I/O Terminals |
| 7 | 24 Volt and 5 Volt Supply for Axis |
| 8 | 40 Way MDR Axis Socket (Female) |
| 9 | 24 Volt Supply for I/O Terminals |

| | |
|----|--------------------------------|
| 10 | 26 Way MDR I/O Socket (Female) |
|----|--------------------------------|

| | |
|---------------------|-----------------------------|
| Storage temperature | -20 to +75 °C |
| Ambient temperature | 0 to +55 °C |
| Ambient humidity | 10 to 80 % (non-condensing) |

■ Dimensions and Components
 The unit's dimensions are 205mm x 80mm x 57 mm (L x H x D) as a Din rail mounted unit without the cables connected.

■ PIN Out for the 15 Way D-Type

| Pin No | Description |
|--------|---|
| 1 | Drive 0 volts |
| 2 | Alarm Output from the Drive |
| 3 | Alarm Reset to the Drive |
| 4 | 0V Encoder Signal |
| 5 | A Step : A phase of the encoder input |
| 6 | B Dir: B Phase of the encoder input |
| 7 | Z BST: Z Phase of the encoder input |
| 8 | V+ : Positive side of the +/-10 V speed command output |
| 9 | 24V DRV: Drive 24 Volt Supply |
| 10 | ENABLE: Drive Enable Signal |
| 11 | 5V Encoder: 5V signal going to an encoder (if required) |
| 12 | /A Step: Complement of the A phase |
| 13 | /B Dir: Complement of the B Phase |
| 14 | /Z BST: Complement of the Z Phase |
| 15 | V- : Common side of the +/-10V speed command signal |

To connect the 15 Way connector to UA or UT Drives use one of the following cables:

- UA CABLE 1 for connecting to UA Drives
- UT CABLE 1 for connecting to UT Drives

■ Cables and Connector Parts

The recommended connector part numbers for the 40 Way MDR and 26 Way MDR Connectors for connection to MC402 are:
 (XX = 40 or 26)

- 3M Part No: 101XX-6000EC or 101XX-6000EL
- 3M Part No: 103XX-A200-00

These are IDC type plugs with a metal back-shell for 40 Way and 26 Way connections. Alternative part numbers for the connectors are:

- 3M Part No: 10140-3000VE
- 3M Part No: 10340-5500-008
- 3M Part No: 10126-3000VE
- 3M Part No: 10326-52F0-008

These are solder bucket versions of the same connectors with plastic shells. The IDC/ solder type connectors can be used with various types of cables. The following cable type is recommended for use with this unit:

- 3M part No: Round-Jacketed, Shielded, Discrete Wire Cable 3444C series, 26 AWG Stranded, Twisted Pair, PVC/PVC

It is also possible to use the OMRON quick connect kit from OMRON for easy "plug and play" connection:

- Part No: 60.220.603.S C200HW-MC402-UK interface module, 205mm wide by 80mm high with 35mm Din Rail mounting feet.
- Part No: 60.220.604.S 26 pole cable for 603, 3M male plug, flat-round-flat ribbon, 3M male plug, 1 metre overall.
- Part No: 60.220.605.S 40 pole cable for 603, 3M male plug, flat-round-flat ribbon, 3M male plug, 1 metre overall.

■ Notes on I/O Connections

There are 16 input and 8 Output Channels are of type therefore both inputs and outputs are negative common. The output switches between 0 and 24 Volts. The Input has to be switched between 0 and 24 Volts. The order of the pin out for I/O is as follows:

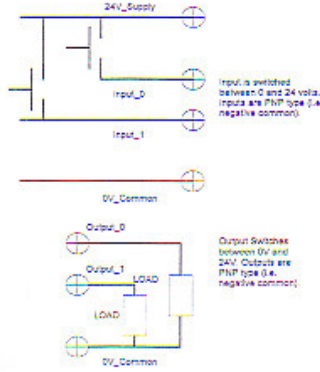
| | | | | | | | | | | |
|-----|-----|-----|-----|----|----|----|----|----|----|----|
| I15 | I13 | I11 | I9 | I7 | I5 | R3 | R1 | O7 | O5 | O3 |
| O1 | I14 | I12 | I10 | I8 | I6 | I4 | R2 | R0 | O6 | O4 |
| O2 | O0 | | | | | | | | | |

Issued by: Mitsubishi Electric Europe B.V. - UK Branch
 Document issue: **Ver March 2007**
 Produced by : - CTC
 Travellers Lane, Hatfield, Herts, AL10 8XB, UK
 Author: Barry Weller

Databank - Technical Bulletin

- "I" denotes a general purpose input
- "R" denotes a general purpose input and a registration input
- "O" denotes a general purpose output

R terminals double up as general purpose inputs and registration inputs for the MC unit. Basic wiring for the general purpose I/O is described below.



0V_Common signal is the 0 Volts from the 24 V supplied for the I/O. This supply is shown as item 9 in the unit specifications on the previous page.

Notes on Power Supplies

There are 2 sets of terminals for supplying power to the interface unit.

1. Item 8: 24 Volt supplied for the uncommitted I/O to the unit.
2. Item 7: 24 Volt and (possible) 5 Volt supplied to the Axes. The 24 volt power supply to the Axes connectors and the uncommitted I/O should in principle be separate. This will ensure 500V RMS galvanic isolation between the general purpose I/O and the drives I/O.
3. The 5 Volt supply is necessary if instead of an OMRON servo drive or an FV Drive a standalone line driver encoder feedback is used. The EV block can be used for supplying power to the encoder.

9 Pin Auxiliary Output

There is a 9 pin D-Type female connector on the interface unit (Item 1). This is used to repeat the encoder signals which are connected to Axis 0 port. This can then be used to carry the signals across to another interface unit and MC402 which in turn allows slaving of another 3 axes from the same master Axis 0.

The Pin outs for the 9 PIN D-Type are given as follows:

| Pin No | Description |
|--------|------------------------------------|
| 1 | 0V Encoder |
| 2 | A Step: A phase of the encoder |
| 3 | B Dir: B Phase of the encoder |
| 4 | Z_Bst: Z phase of the encoder |
| 5 | None |
| 6 | /A Step: Complement of the A phase |
| 7 | /B Dir: Complement of the B Phase |
| 8 | /Z_BST: Complement of the Z Phase |
| 9 | None |

To connect two interface units together in this way make up a cable to connect the Axis 0 Auxiliary encoder output to Axis 0 of another MC402 unit.

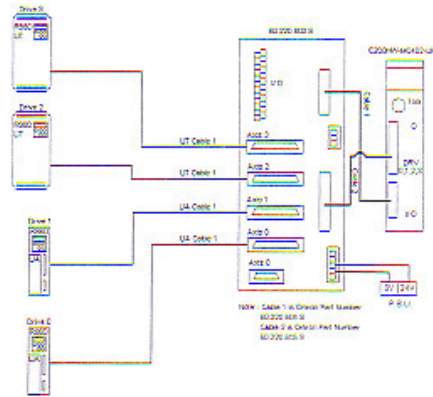
Notes on Terminating Resistors

If the distance of the encoder from the MC402 unit is more than 10m then terminating resistors should be used with the interface units. These will have to be soldered on to the sites provided by competent personnel. The resistor pack recommended for this operation is

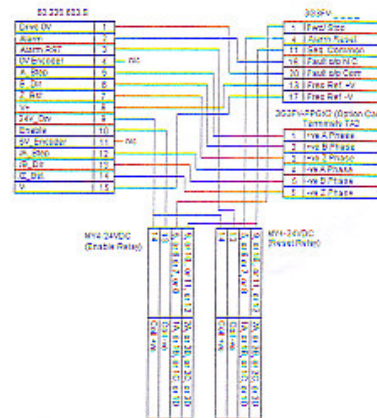
- 220Ω / 0.2 W resistors e.g. Bourns 4306R-102-221 which contains 6 isolated resistors in one package

Connections to UA, UT and FV drives

Connecting Omron R88D-UT & UA Servo Drives to an Omron C200HW-MC402-UK via a 60.220.603.S relay unit.



Wiring diagram for C200HW-MC402-UK relay unit (60.220.603.S) to 3S3FV Flux Vector Inverters. (15 way 'D' connectors to drive terminals)



OMRON

OMRON ELECTRONICS LTD (UK)

OMRON ELECTRONICS LTD.

1 Apsley Way, Staples Corner, LONDON, UK, NW2 7HF.
 Phone (+44)(0) 208 450 46 46, Fax (+44)(0) 208 450 80 87
 Note: Specification subject to change without notice
 Printed in the UK