

1. INSTALLATION AND ELECTRICAL CONNECTIONS

1.1 CLEVER CENTER CONNECTION

The outputs of the array of Clever Multimach valves are powered and controlled by the Clever Center module via a D-Sun 44-pin male connector.

The connector has:

- 32 pins for controlling the 32 valves (solenoid pilots), to be connected to the control system inputs, the PLC, PC and other utilities...
- 3 pins for +24 Vdc power supply;
- 3 pins 0V (GND) power supply;
- 1 pin for fault signals (Out DIAG);
- pin PNP/NPN configuration of the system (CFG).

| PIN | FUNCTION | PIN | FUNCTION | PIN | FUNCTION | PIN | FUNCTION |
|-----|--------------|-----|--------------|-----|--------------------|-----|----------------|
| 1 | EV1 control | 12 | EV12 control | 23 | EV23 control | 34 | Reserved |
| 2 | EV2 control | 13 | EV13 control | 24 | EV24 control | 35 | Reserved |
| 3 | EV3 control | 14 | EV14 control | 25 | EV25 control | 36 | +24 Vdc |
| 4 | EV4 control | 15 | EV15 control | 26 | EV26 control | 37 | +24 Vdc |
| 5 | EV5 control | 16 | EV16 control | 27 | EV27 control | 38 | +24 Vdc |
| 6 | EV6 control | 17 | EV17 control | 28 | EV28 control | 39 | In CFG config. |
| 7 | EV7 control | 18 | EV18 control | 29 | EV29 control | 40 | Reserved |
| 8 | EV8 control | 19 | EV19 control | 30 | EV30 control | 41 | Reserved |
| 9 | EV9 control | 20 | EV20 control | 31 | EV31 control | 42 | GND |
| 10 | EV10 control | 21 | EV21 control | 32 | EV32 control | 43 | GND |
| 11 | EV11 control | 22 | EV22 control | 33 | Output faulty DIAG | 44 | GND |

WARNING

Power off the system before plugging in or unplugging the connectors (risk of functional damages).

Connect the module to earth using the correct wire. If necessary, use one of the free fixing holes. Failure to make the earth connection may cause faults and irreversible damages in the event of electrostatic discharges.

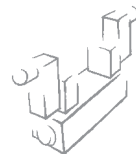
Use fully assembled valve units only.

Only use power packs complying with the IEC 742/ EN60742/VDE0551 standard and with a minimum insulation resistance of 4kV (PELV).

1.2 VALVE CONNECTION

Clever Center input terminal converts the signals arriving in parallel from the connector pin into a serial transmission. Metal Work CM serial communication protocol controls the valves and handles diagnostics. The valves are automatically powered on via the built-in 9-pin connector, by approaching and securing the valves one another. Multiple valves can be connected up until all the 32 outputs have been used.





1.3 SLAVE MODULE CONNECTION

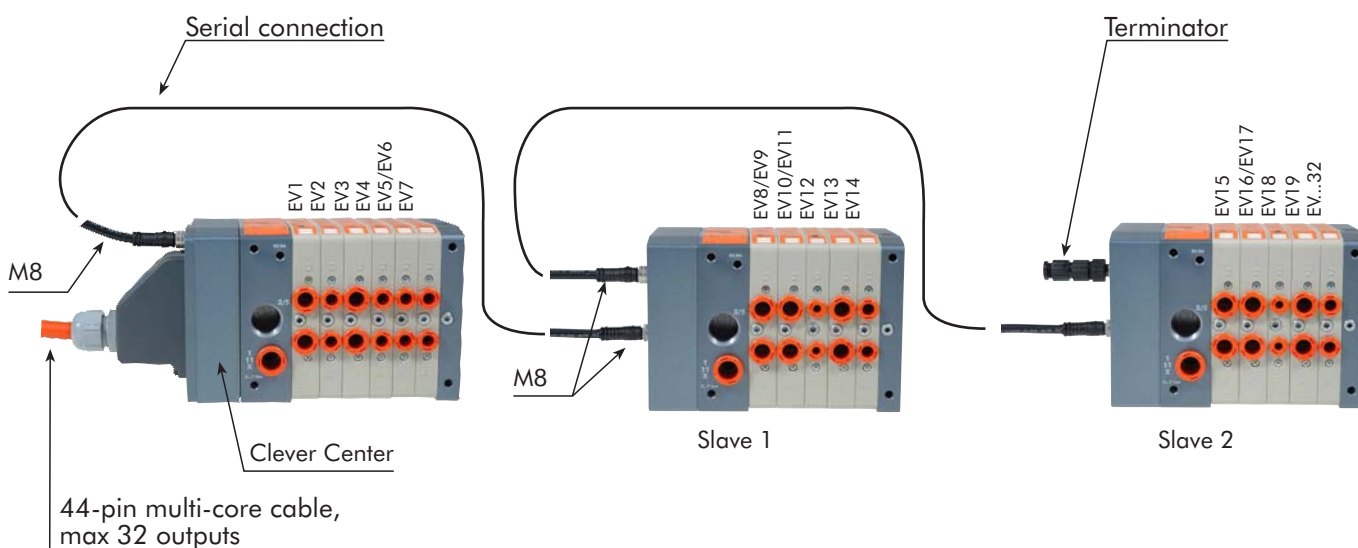
The Slave modules can be connected using an M8 4-pin connector, which feeds the valves and controls them via Metal Work CM serial communication protocol. Multiple slave module arrays can be connected up until all the 32 outputs have been used.

1.4 SERIAL LINE COMPLETION

For correct operation, the serial line needs to be completed. The valve line is completed automatically by closing the array of valves with a blind terminal. The line connecting the slave modules is completed by inserting the M8 terminal into the M8 female connector of the Clever Center if there are no slave modules, or to the connector of the last slave module in the network.

1.5 OUTPUT CONFIGURATION

The slave modules need not to be addressed. The connected valves are automatically assigned a number on start-up, from the first valve connected to the Clever Center module to the last one connected to the slave module in the network. Monostable valves require 1 output, bistable valves 2 outputs.



⚠ IMPORTANT

If the array configuration is modified, valve numbering will automatically be updated.

2. INPUT MODULE CONNECTION

If you choose a dedicated Clever Center, you can insert INPUT signal control modules, such as the cylinder sensors. The inputs are connected on the Clever Center module using a D-Sub 44-pin female connector.

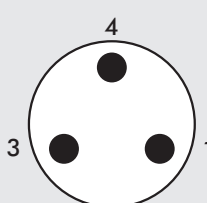
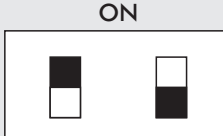
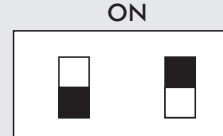
The connector comprises:

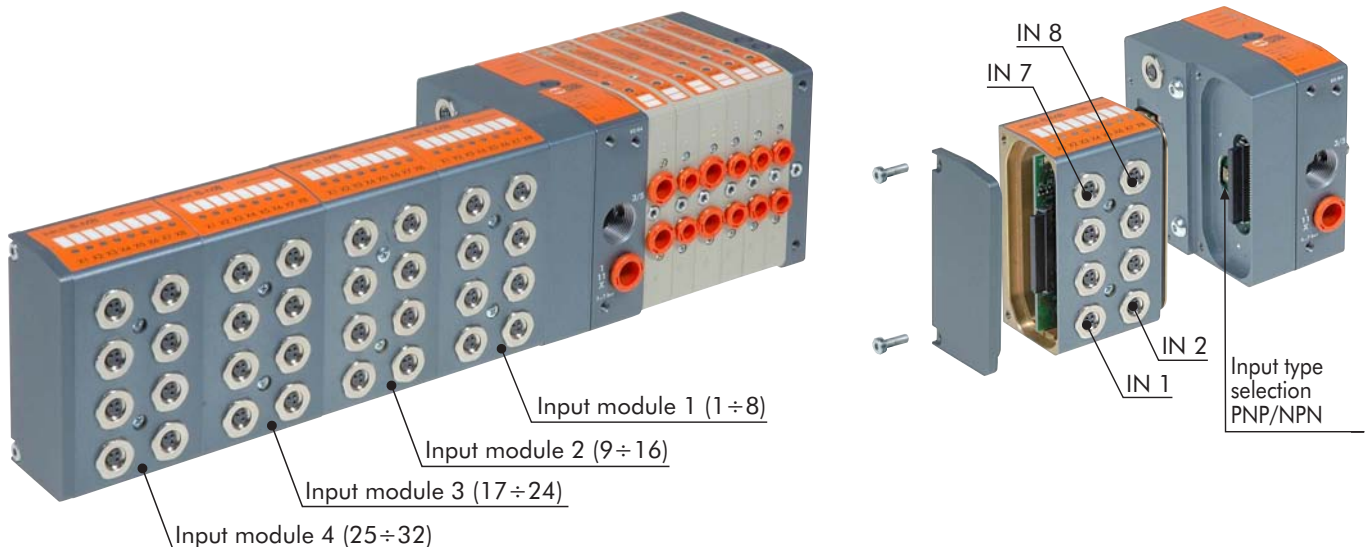
- 32 pins for reading 32 digital signals from the input modules, to be connected to the control system inputs, the PLC, PC and other utilities...
- 3 pins for +24VDC power supply;
- 3 pins for 0V (GND) power supply.

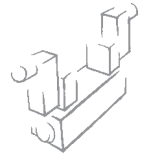
The type of PNP/NPN input can be selected via a dip switch mounted below the Master module cover.

The input modules need not to be addressed. The address is automatically assigned starting from the first module connected to the Clever Center.

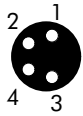
| PIN | FUNCTION | PIN | FUNCTION | PIN | FUNCTION | PIN | FUNCTION |
|-----|----------|-----|----------|-----|----------|-----|----------|
| 1 | Input 1 | 12 | Input 12 | 23 | Input 23 | 34 | NC |
| 2 | Input 2 | 13 | Input 13 | 24 | Input 24 | 35 | NC |
| 3 | Input 3 | 14 | Input 14 | 25 | Input 25 | 36 | +24 Vdc |
| 4 | Input 4 | 15 | Input 15 | 26 | Input 26 | 37 | +24 Vdc |
| 5 | Input 5 | 16 | Input 16 | 27 | Input 27 | 38 | +24 Vdc |
| 6 | Input 6 | 17 | Input 17 | 28 | Input 28 | 39 | NC |
| 7 | Input 7 | 18 | Input 18 | 29 | Input 29 | 40 | NC |
| 8 | Input 8 | 19 | Input 19 | 30 | Input 30 | 41 | NC |
| 9 | Input 9 | 20 | Input 20 | 31 | Input 31 | 42 | GND |
| 10 | Input 10 | 21 | Input 21 | 32 | Input 32 | 43 | GND |
| 11 | Input 11 | 22 | Input 22 | 33 | NC | 44 | GND |

| | | |
|--|---|---|
| M8 3-PIN CONNECTOR  Pin 1 = +24 Vdc Pin 3 = GND Pin 4 = Input | PNP INPUT TYPE SELECTION  ON OFF 50-pin connector | NPN INPUT TYPE SELECTION  ON OFF 50-pin connector |
| If the 2 dip switches are both OFF, the indicator lights do not come on. If the 2 dip switches are both ON, all the lights come on together | | |

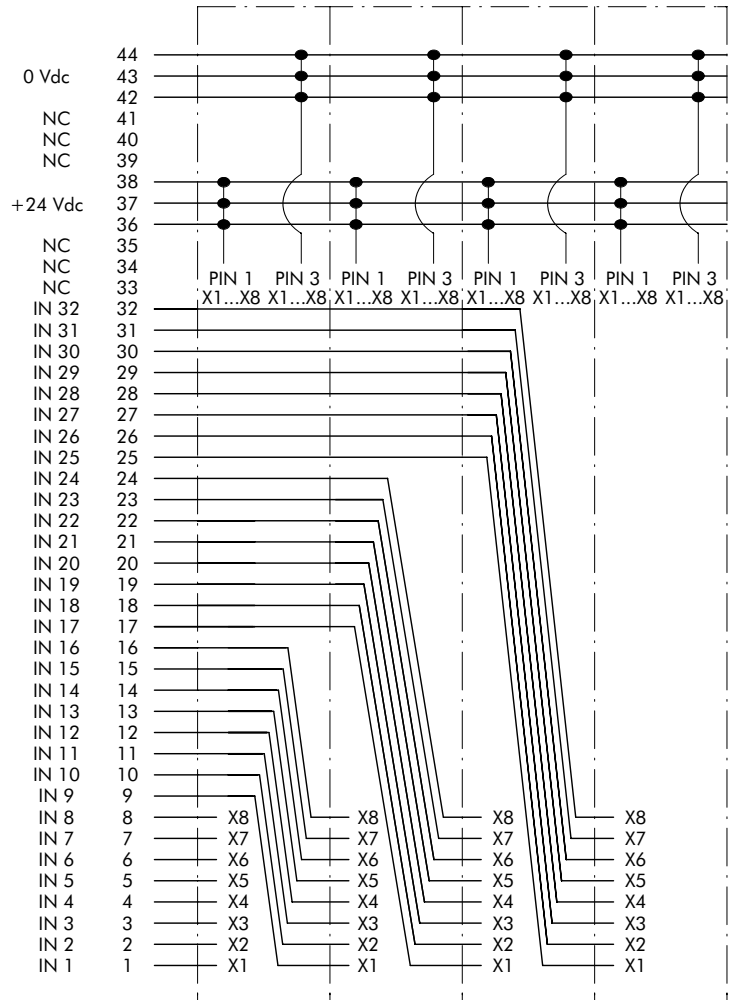
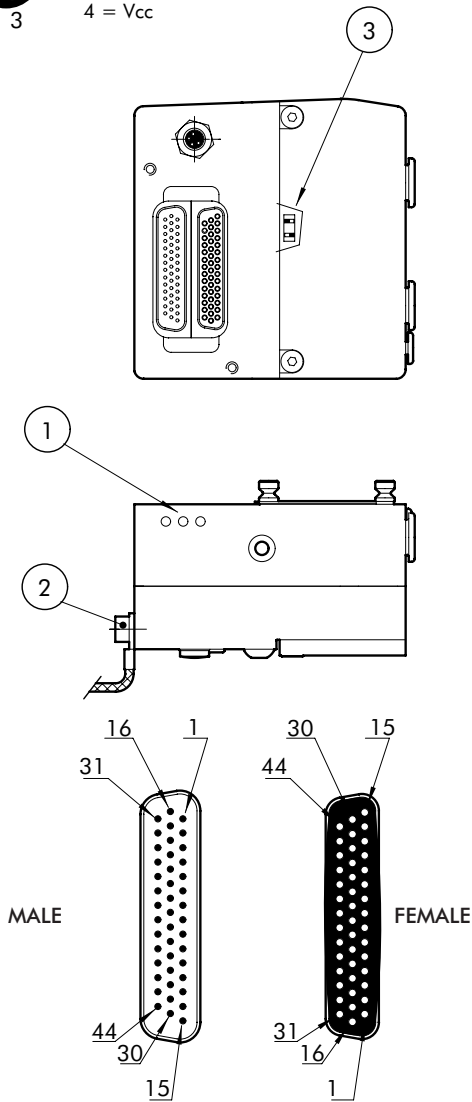




INPUT CONNECTION DIAGRAM



- 1 = RTX +
- 2 = GND
- 3 = RTX -
- 4 = Vcc



- ① Indicator LED
- ② Grounding
- ③ Input selector type
PNP/NPN

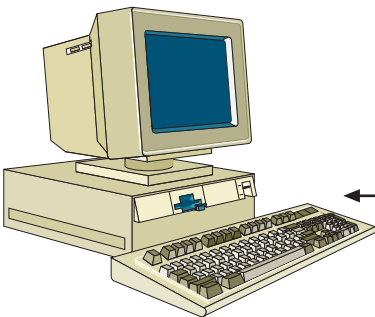
3. DIAGNOSTICS

3.1 CLEVER CENTER DIAGNOSTICS

Clever Center module diagnostics is defined by the status of the interface lights. When an alarm is generated, and Out DIAG fault is indicated.



| Green power ON light | Red BUS error light | Red local error light | OUT DIAG | MEANING |
|-----------------------|---------------------|-----------------------|----------|---|
| ON (green) ● | OFF ○ | OFF ○ | OFF | The module is operating correctly. |
| Green (flashing) ● | OFF ○ | OFF ○ | ON | Number of valves connected to the network greater than 32. |
| ON (green) ● | OFF ○ | Red (flashing) ● | ON | Solenoid pilot interrupted or short-circuit on the solenoid valve connected to the Clever Center module. Serial line linking the solenoid valve to the Clever Center module interrupted. |
| ON (green) ● | Red (flashing) ● | OFF ○ | ON | Serial line connecting to a subsequent slave module interrupted or not completed. |



Error signal OUT DIAG

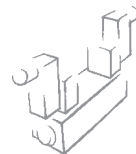


3.2 SLAVE MODULE DIAGNOSTICS

Slave module diagnostics is defined by the status of the interface lights. When an alarm is generated, and Out DIAG fault is indicated

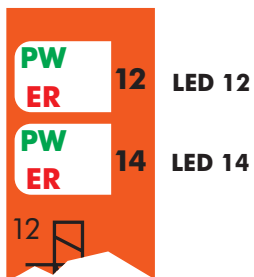


| Green power ON light | Red BUS error light | Red local error light | OUT DIAG | MEANING |
|----------------------|---------------------|-----------------------|-------------------|---|
| ON (green) ● | OFF ○ | OFF ○ | OFF | The module is operating correctly. |
| ON (green) ● | OFF ○ | Red (Flashing) ● | ON (Intermittent) | Solenoid pilot interrupted or short-circuit on the solenoid valve connected to the module. |
| ON (green) ● | OFF ○ | Red (Flashing) ● | ON | Serial line connecting the solenoid valve to the module interrupted. |
| OFF (green) ● | Red (Flashing) ● | OFF ○ | ON | Serial line connecting to a subsequent slave module interrupted or not completed. Center Clever serial line interrupted. |



3.2 VALVE MODULE DIAGNOSTICS

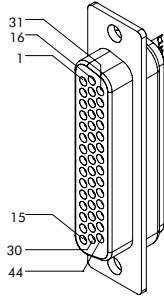
Valve module diagnostics is defined by the status of the interface lights.
When an alarm is generated, and Out DIAG fault is indicated on clever center



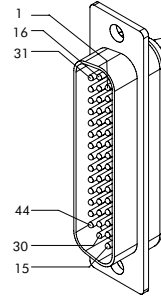
| | LED 12 | MEANING |
|-----------------------|---------------------|--|
| OFF ○ | OFF ○ | No fault, EV1-EV2=OFF |
| ON (green) ● | OFF ○ | No fault, EV1=ON - EV2=OFF |
| ON (green) ● | ON (green) ● | No fault, EV1-EV2=ON |
| ON-OFF ○ | ON (green) ● | No fault, EV1=OFF - EV2=ON |
| Red (flashing) ● | OFF ○ | Solenoid pilot EV1 interrupted or disconnected |
| OFF ○ | Red (flashing) ● | Solenoid pilot EV2 interrupted or disconnected |
| ON (red) ● | OFF ○ | Solenoid pilot EV1 short circuit |
| OFF ○ | ON (red) ● | Solenoid pilot EV2 short circuit |
| Green (flashing) ● | OFF ○ | Data update time out, communication faulty |

4. PRE-WIRED CABLE CONNECTION

WIRING TABLE FOR 44-PIN PRE-WIRED CUP CONNECTOR FOR VALVE



WIRING TABLE FOR 44-PIN PRE-WIRED CUP CONNECTOR FOR INPUT



| 44 PIN FEMALE | Position of electrical contact | Corresponding wire colour | Function |
|---------------|--------------------------------|---------------------------|----------------------|
| | 1 | white | Out 1 |
| | 2 | brown | Out 2 |
| | 3 | green | Out 3 |
| | 4 | yellow | Out 4 |
| | 5 | gray | Out 5 |
| | 6 | pink | Out 6 |
| | 7 | blue | Out 7 |
| | 8 | violet | Out 8 |
| | 9 | gray/pink | Out 9 |
| | 10 | red/blue | Out 10 |
| | 11 | white/green | Out 11 |
| | 12 | brown/green | Out 12 |
| | 13 | white/yellow | Out 13 |
| | 14 | yellow/brown | Out 14 |
| | 15 | white/gray | Out 15 |
| | 16 | gray/brown | Out 16 |
| | 17 | white/pink | Out 17 |
| | 18 | pink/brown | Out 18 |
| | 19 | white/blue | Out 19 |
| | 20 | brown/blue | Out 20 |
| | 21 | white/red | Out 21 |
| | 22 | brown/red | Out 22 |
| | 23 | white/black | Out 23 |
| | 24 | brown/black | Out 24 |
| | 25 | gray/green | Out 25 |
| | 26 | yellow/gray | Out 26 |
| | 27 | pink/green | Out 27 |
| | 28 | yellow/pink | Out 28 |
| | 29 | green/blue | Out 29 |
| | 30 | yellow/blue | Out 30 |
| | 31 | green/red | Out 31 |
| | 32 | yellow/red | Out 32 |
| | 33 | green/black | Segnalazione guasto |
| | 34 | gray/blue | NC |
| | 35 | gray/red | NC |
| | 36 | red | +24Vdc |
| | 37 | red | +24Vdc |
| | 38 | red | +24Vdc |
| | 39 | yellow/black | Config. PNP/NPN |
| | 40 | pink/red | NC |
| | 41 | pink/blue | Uscita seriale RS232 |
| | 42 | black | 0 Vdc |
| | 43 | black | 0 Vdc |
| 44 | black | 0 Vdc | |

| 44 PIN MALE | Position of electrical contact | Corresponding wire colour | Function |
|-------------|--------------------------------|---------------------------|----------|
| | 1 | white | In 1 |
| | 2 | brown | In 2 |
| | 3 | green | In 3 |
| | 4 | yellow | In 4 |
| | 5 | gray | In 5 |
| | 6 | pink | In 6 |
| | 7 | blue | In 7 |
| | 8 | violet | In 8 |
| | 9 | gray/pink | In 9 |
| | 10 | red/blue | In 10 |
| | 11 | white/green | In 11 |
| | 12 | brown/green | In 12 |
| | 13 | white/yellow | In 13 |
| | 14 | yellow/brown | In 14 |
| | 15 | white/gray | In 15 |
| | 16 | gray/brown | In 16 |
| | 17 | white/pink | In 17 |
| | 18 | pink/brown | In 18 |
| | 19 | white/blue | In 19 |
| | 20 | brown/blue | In 20 |
| | 21 | white/red | In 21 |
| | 22 | brown/red | In 22 |
| | 23 | white/black | In 23 |
| | 24 | brown/black | In 24 |
| | 25 | gray/green | In 25 |
| | 26 | yellow/gray | In 26 |
| | 27 | pink/green | In 27 |
| | 28 | yellow/pink | In 28 |
| | 29 | green/blue | In 29 |
| | 30 | yellow/blue | In 30 |
| | 31 | green/red | In 31 |
| | 32 | yellow/red | In 32 |
| | 33 | green/black | NC |
| | 34 | gray/blue | NC |
| | 35 | gray/red | NC |
| | 36 | red | +24Vdc |
| | 37 | red | +24Vdc |
| | 38 | red | +24Vdc |
| | 39 | yellow/black | NC |
| | 40 | pink/red | NC |
| | 41 | pink/blue | NC |
| | 42 | black | 0 Vdc |
| | 43 | black | 0 Vdc |
| 44 | black | 0 Vdc | |