

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);
- 1 pin (39) PNP/NPN configuration of the system (CFG). To control the valves with PNP logic, connect the pin 39 to the +24V one; to control them with NPN logic connect the pin 39 to the GND one.

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).

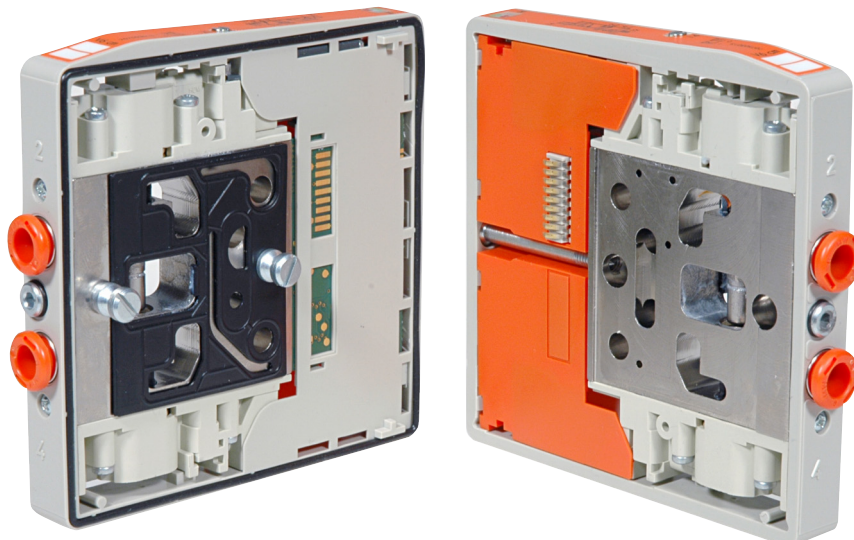
Connect the module to earth using the correct wire. If necessary, use one of the free fixing holes. Failure to make the earth connection may cause faults and irreversible damages in the event of electrostatic discharges.

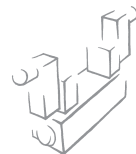
Use fully assembled valve units only.

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

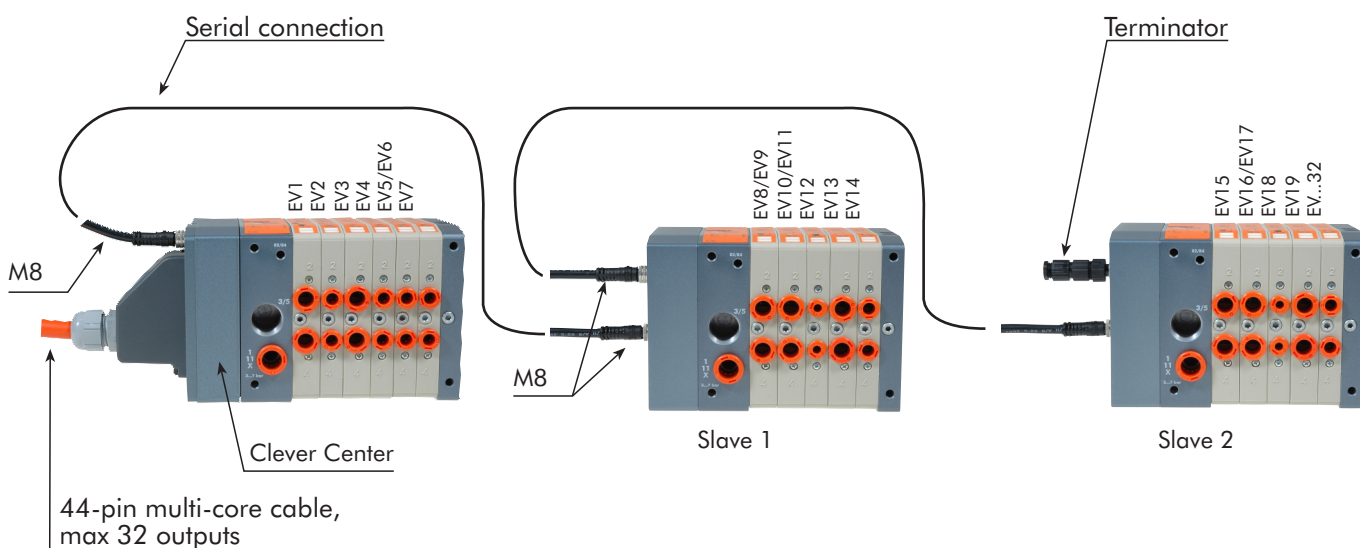
The Slave modules can be connected using an M8 4-pin connector, which feeds the valves and controls them via Metal Work CM serial communication protocol. Multiple slave module arrays can be connected up until all the 32 outputs have been used.

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.

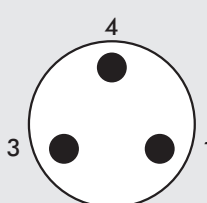
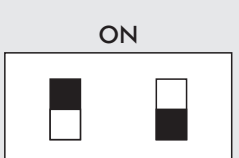
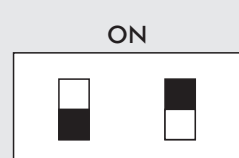
The connector comprises:

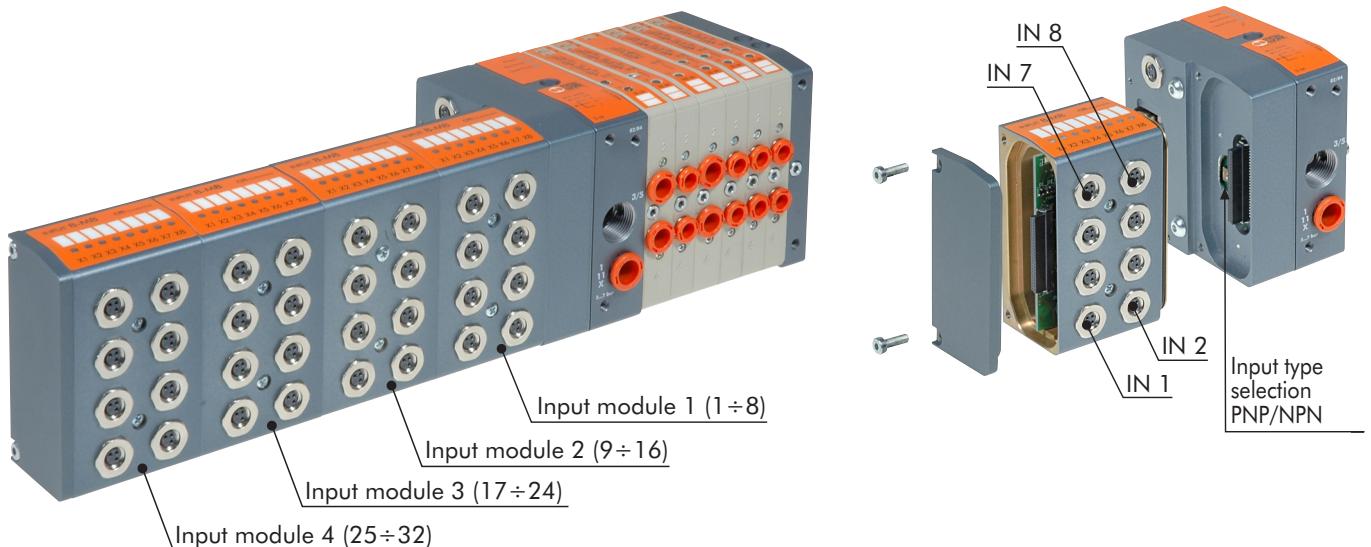
- 32 pins for reading 32 digital signals from the input modules, to be connected to the control system inputs, the PLC, PC and other utilities...
- 3 pins for +24VDC power supply;
- 3 pins for 0V (GND) power supply.

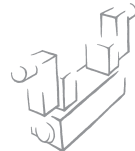
The type of PNP/NPN input can be selected via a dip switch mounted below the Master module cover.

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

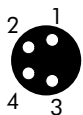
PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	Input 1	12	Input 12	23	Input 23	34	NC
2	Input 2	13	Input 13	24	Input 24	35	NC
3	Input 3	14	Input 14	25	Input 25	36	+24 Vdc
4	Input 4	15	Input 15	26	Input 26	37	+24 Vdc
5	Input 5	16	Input 16	27	Input 27	38	+24 Vdc
6	Input 6	17	Input 17	28	Input 28	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	PNP INPUT TYPE SELECTION	NPN INPUT TYPE SELECTION
 <p>Pin 1 = +24 Vdc Pin 3 = GND Pin 4 = Input</p>	 <p>ON</p> <p>OFF</p> <p>50-pin connector</p>	 <p>ON</p> <p>OFF</p> <p>50-pin connector</p>
<p>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</p>		

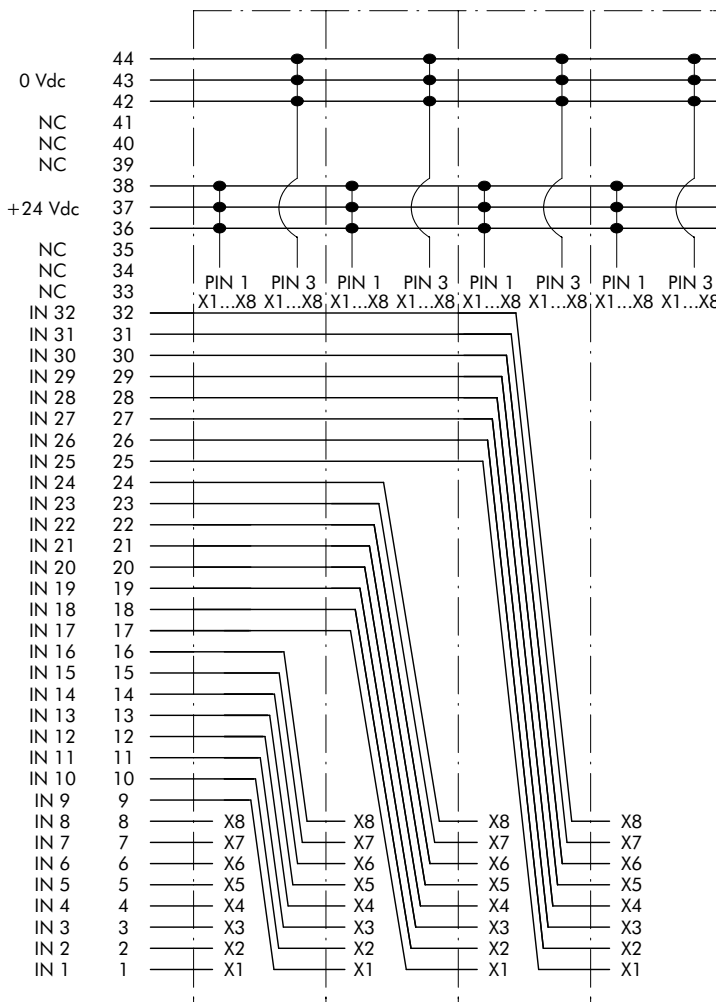
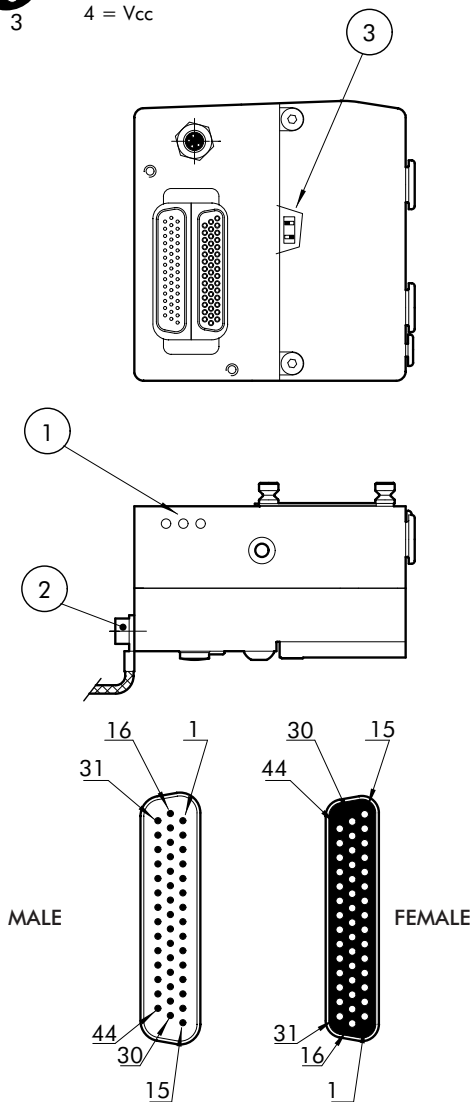




INPUT CONNECTION DIAGRAM



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















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

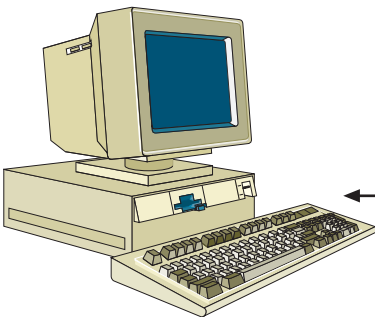
3. DIAGNOSTICS

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

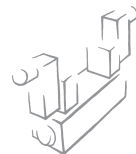


3.2 SLAVE MODULE DIAGNOSTICS

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

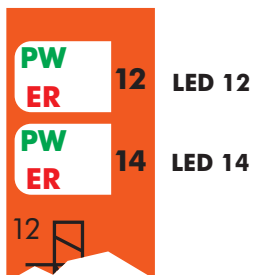


Green power ON light	Red BUS error light	Red local error light	OUT DIAG	MEANING
ON (green) 	OFF 	OFF 	OFF	The module is operating correctly.
ON (green) 	OFF 	Red (Flashing) 	ON (Intermittent)	Solenoid pilot interrupted or short-circuit on the solenoid valve connected to the module.
ON (green) 	OFF 	Red (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

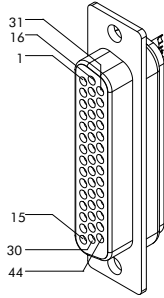
Valve module diagnostics is defined by the status of the interface lights.
When an alarm is generated, and Out DIAG fault is indicated on clever center



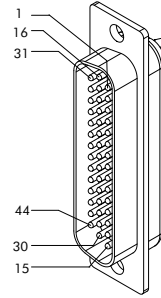
	LED 12	MEANING
OFF ○	OFF ○	No fault, EV1-EV2=OFF
ON (green) ●	OFF ○	No fault, EV1=ON - EV2=OFF
ON (green) ●	ON (green) ●	No fault, EV1-EV2=ON
OFF ○	ON (green) ●	No fault, EV1=OFF - EV2=ON
Red (flashing) ●	OFF ○	Solenoid pilot EV1 interrupted or disconnected
OFF ○	Red (flashing) ●	Solenoid pilot EV2 interrupted 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	NC
	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	