MANY0318A.00
Airmaster R1 hardware installation guide for the standard HMI

Version 1.0

safety warning!

Do not operate the Airmaster R1 HMI until you and all the personnel concerned have read and understood this installation guide.

Important notes

Installation and startup may only be done by trained personnel according to safe engineering practices and with the observance of all relevant local health and safety requirements and regulations.

A requirement of fault-free operation and fulfillment of any rights to claim under guarantee is that the documentation is observed. In case of doubt please contact CMC.

This document could be subject to changes. Please contact our factory in case of doubt in order to ensure that you have received the latest version.

Signs:

Hazardous situation or harmful situation
Possible consequences: Slight or minor injuries, also possible damage to the unit and the environment.

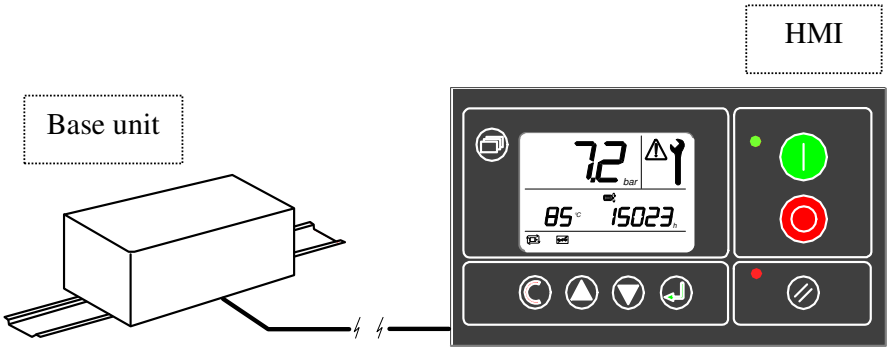
Electrical hazard:
Possible consequences: Severe or fatal injuries

UL For the American (US) market

Table of contents

1. Introduction

The Airmaster R1 is an industrial controller consisting of two parts: a base unit and an HMI (Human Machine Interface). The base unit is the real control unit and the HMI is the unit for interaction with the user.



This hardware installation guide is a guide for the hardware related items. Please read the software specficiations file for information on how to work with the unit.

The application area is restricted to machines that comply with the European machine directive 89/37/EEC and 89/336/EEC. The application area is located in electrical

driven compressors and dryers in an industrial environment. Please contact CMC for appliance in other machines.

The Airmaster R1 is a component, which can't operate without other components. However, it is not a safety component, and it is not a machine.

The controller is to be used in a standard industrial environment. The controller may only be used in places without an explosion risk. So it may never be used where explosion-proof equipment is required. This controller may not be used for maritime purposes. It may also not be used in any way as part of an assembly that could be used for unauthorized or inappropriate military or terrorist activities.

The Airmaster R1 does not need to comply to the European Pressure Equipment Directive, because no parts are under pressure, and the Airmaster R1 is not a safety component.

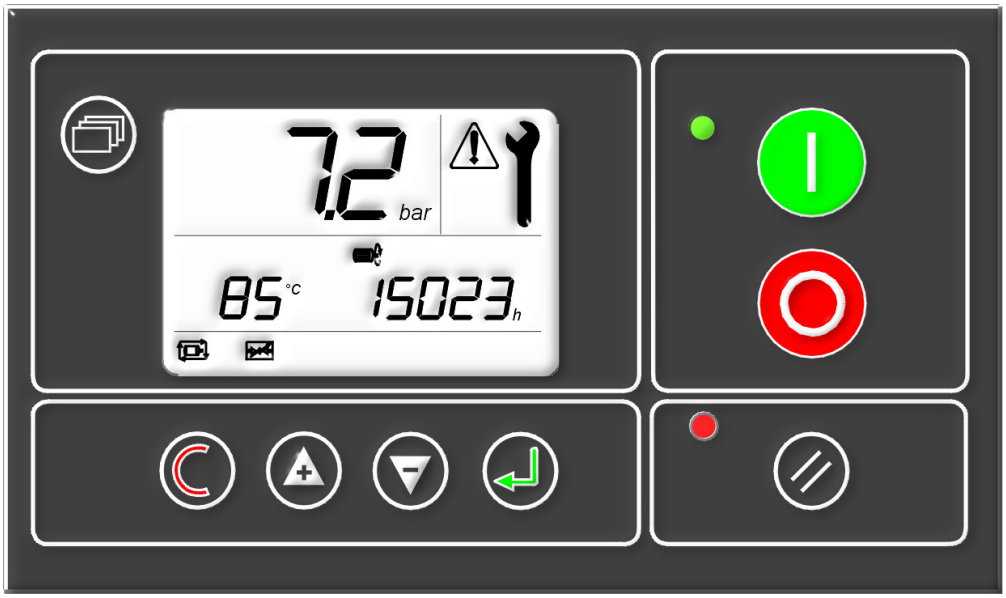
The installation of the controller must be made in accordance with the applicable national and international standards and regulations.

For the American market UL508 is applicable, in accordance with the NFPA.

National and international directives and standards can change in time. Please check them at a regular basis, and make modifications to your equipment where this should be necessary.

2. Technical specifications

Construction	steel plate, steel rear cover
Fascia	IP65 (NEMA 12)
Backside	IP10
Mounting	Panel, 4 x M4 stud
Sealing	Gasket, IP65 (NEMA 12)
Display	Backlit LCD symbolic/numeric
Indicators	2, LED
Buttons	8, tactile response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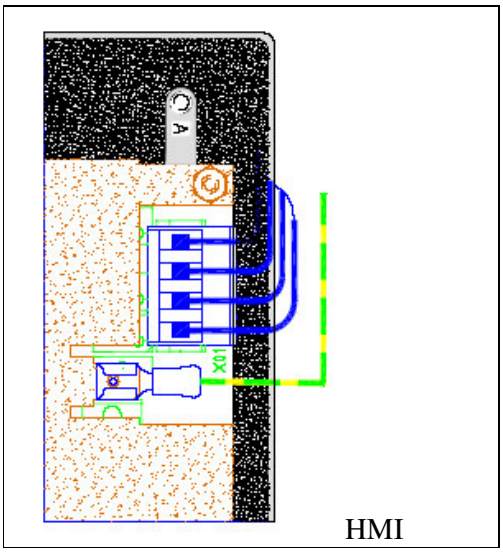
3. Safety

The Airmaster R1 is a class I equipment in which protection against electric shock does not rely on basic insulation only, but which includes an additional safety precaution in that accessible conductive parts are connected to the protective earthing conductor in the fixed wiring of the installation in such a way that they cannot become live in the event of a failure of the basic insulation.

The Airmaster R1 base unit and also the HMI unit must be earthed. See drawings below. The nut near the connector can also be used for a fixed earth connection.



HMI

The enclosure must be earthed at all times.

Low voltage (low current, limited energy) wires must be separated from the power wires.

CMC disclaims any warranty in case the Airmaster R1 HMI has been opened or repaired by an unauthorized person.

4. Electromagnetic compatibility

The enclosure is an important part of the protection of the electronics against electromagnetic interference. Also the radiation of electromagnetic energy is shielded by the enclosure. Therefore it is necessary to earth the enclosure with a very short wire to the nearest earthed metal part. We advise a maximum length of 20cm. Use a stranded wire with at least a section of 1,0mm2.

The electromagnetic compatibility of the unit can not be guaranteed when the unit is opened.

The use of shielded cables, especially for analog inputs and digital communication is highly recommended in order to have a correct EMC installation.

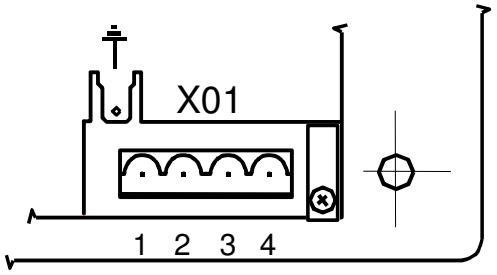
It is the responsibility of the user to design the machine or installation to which this equipment is to be fitted according to the rules of a good EMC installation.

Susceptibility	IEC 801-2, EN61000-4-2 level 4, 8kV discharge IEC 801-3, EN61000-4-3 level 3, 10V/m electric field IEC 801-4, EN61000-4-4 level 4, 4kV transient on supply IEC 801-5, EN61000-4-5 level 4, 2kV surge on supply (L-PE)
Emissions	CISPR 22, EN55022 class A industrial radiated CISPR 22, EN55022 class A industrial conducted

5. Installation

5.1 Supply

Normally, the supply for the R1 HMI comes from the Airmaster R1 base unit.
The supply voltage must be 8Vdc nominal, and must be stabilized. The voltage variation must be less than 0,5Vdc. The HMI is fused internally by a 5x20mm 0,5A slow blow (T) type fuse (250Vac)

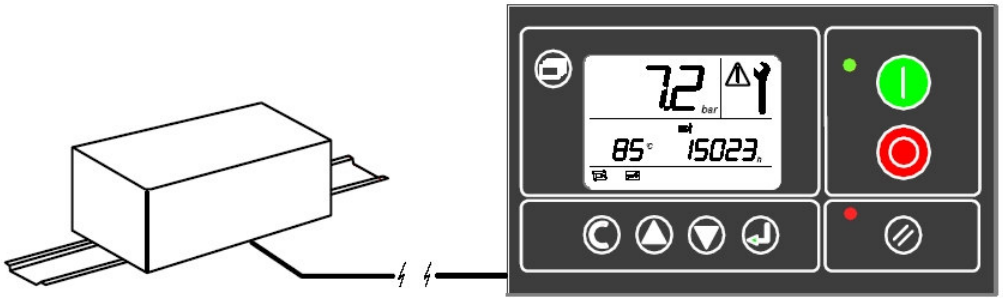


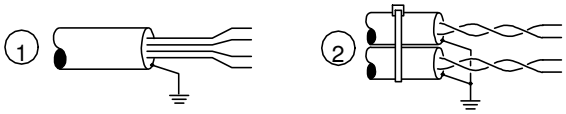
Connector X01	pin 1	+8VDC	+8VDC supply
	pin 2	GND	0VDC supply
	pin 3	L1	RS485 +L1
	pin 4	L2	RS485 –L2

The application of an overvoltage on the HMI supply or RS-485 connection will damage the HMI unit. A supply undervoltage can result in malfunctioning.

5.2 RS-485 Communication

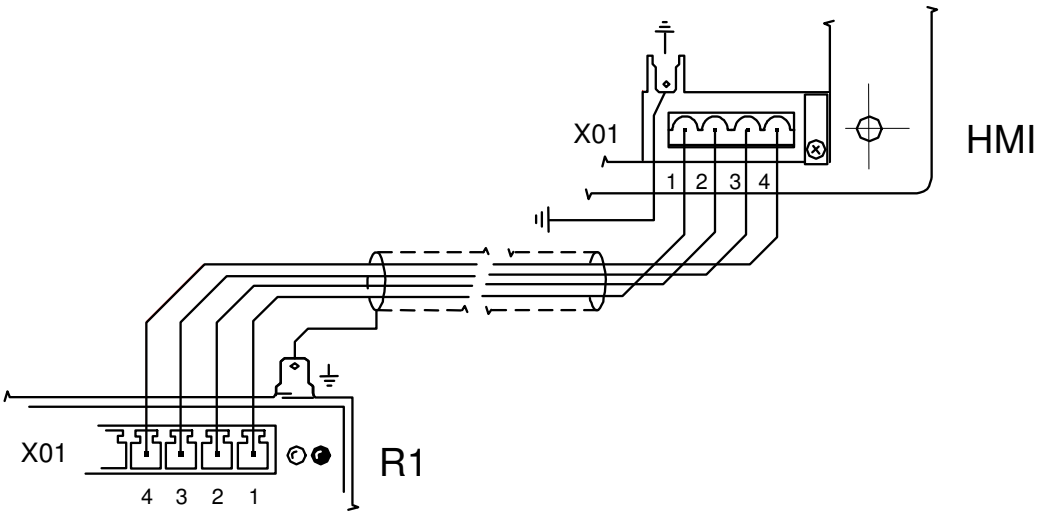
The HMI unit can be located remote from the Airmaster R1 up to 10m (33ft) cable length.





The HMI can be located remote from the Airmaster R1. For cable lengths up to 2m (6ft) a 4-wire, earth shielded, cable (1) can be used; for cable lengths greater than 2m (6ft) or for environments with high electrical noise potential (inverter or switching drive for example) use two twisted pair, earth shielded, cables (2) to UL 2092 or equivalent. UL 2448 or 2919 or equivalent may only be used if they run far from cables which are outside the scope of low voltage limited energy circuits.

5.3 Connection example



6. Mounting

The Airmaster R1 HMI must be mounted in a front panel, enclosure or housing, which must have a suitable protection degree for the electronics. The dimensions of the apertures in the panel are given in appendix 1.

The unit can be mounted by using M4 nuts and lock washers. The maximum torque is 1.1Nm.

The panel, enclosure or housing must have a suitable protection degree for the electronics.

At the rear of the unit there must be enough space for cabling and connectors.

Lack of space between the unit and other devices in a switchbox could damage the Airmaster R1 HMI.

The rear of the HMI unit should be protected against condensation. Condensation is allowed at the front of the HMI although direct water injection should be avoided. The rear of the HMI must also be protected agains ingress of dust or other particles.

For a good visibility of the display direct sunlight on the HMI unit must be avoided.

Do not push on the screen as this could result in damage of the window and/or display.

UL

The Airmaster R1 HMI has an enclosure. However, for an end product this is not enough. The OEM customer must protect this controller with an enclosure conforming to the UL50 standard as this is mentioned in the UL508 standard.

7. Putting into operation

It is not allowed to plug in any connector before connecting safety earth. Also disconnecting safety earth is only allowed when all other connectors are plugged out. See also chapters Safety and EMC.

Connect safety earth first and disconnect safety earth last.

8. Configuration

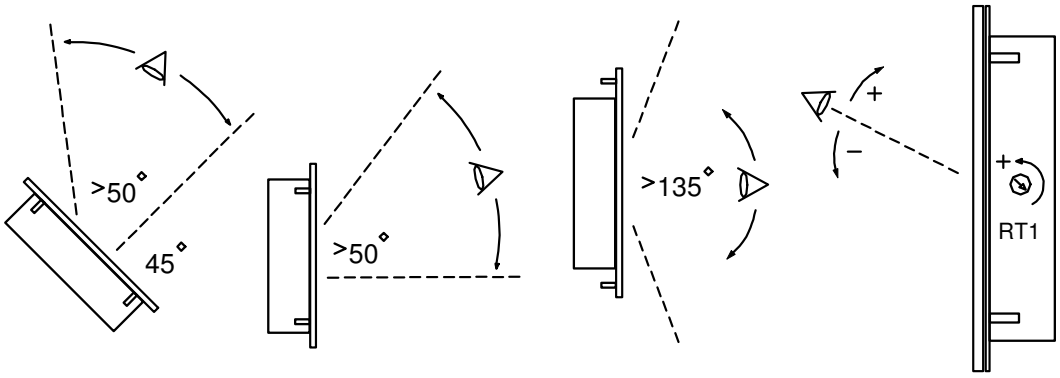
No hardware configuration necessary.

9. Adjusting

The only possible adjustment is the contrast of the display. In the factory this is already adjusted to its best position. When another contrast is necessary the 270 degrees trimpotentiometer can be used. Use a screwdriver with a 2.5mm blade.

From the display side, the trimpotentiometer is located on the right side of the HMI.

No high pushing pressure is allowed on the trimpotentiometer, otherwise damage could occur. If operator feels that the trimpotentiometer is at one of its ends, do not try to move it further, otherwise damage will occur.



10. Maintenance

The Airmaster R1 HMI does not need maintenance.

When the frontpanel of the HMI is dirty, it can be cleaned with a soft cloth using soap water or methanol.

Methanol is a toxic and flammable fluid. Please observe the precautions of your supplier.

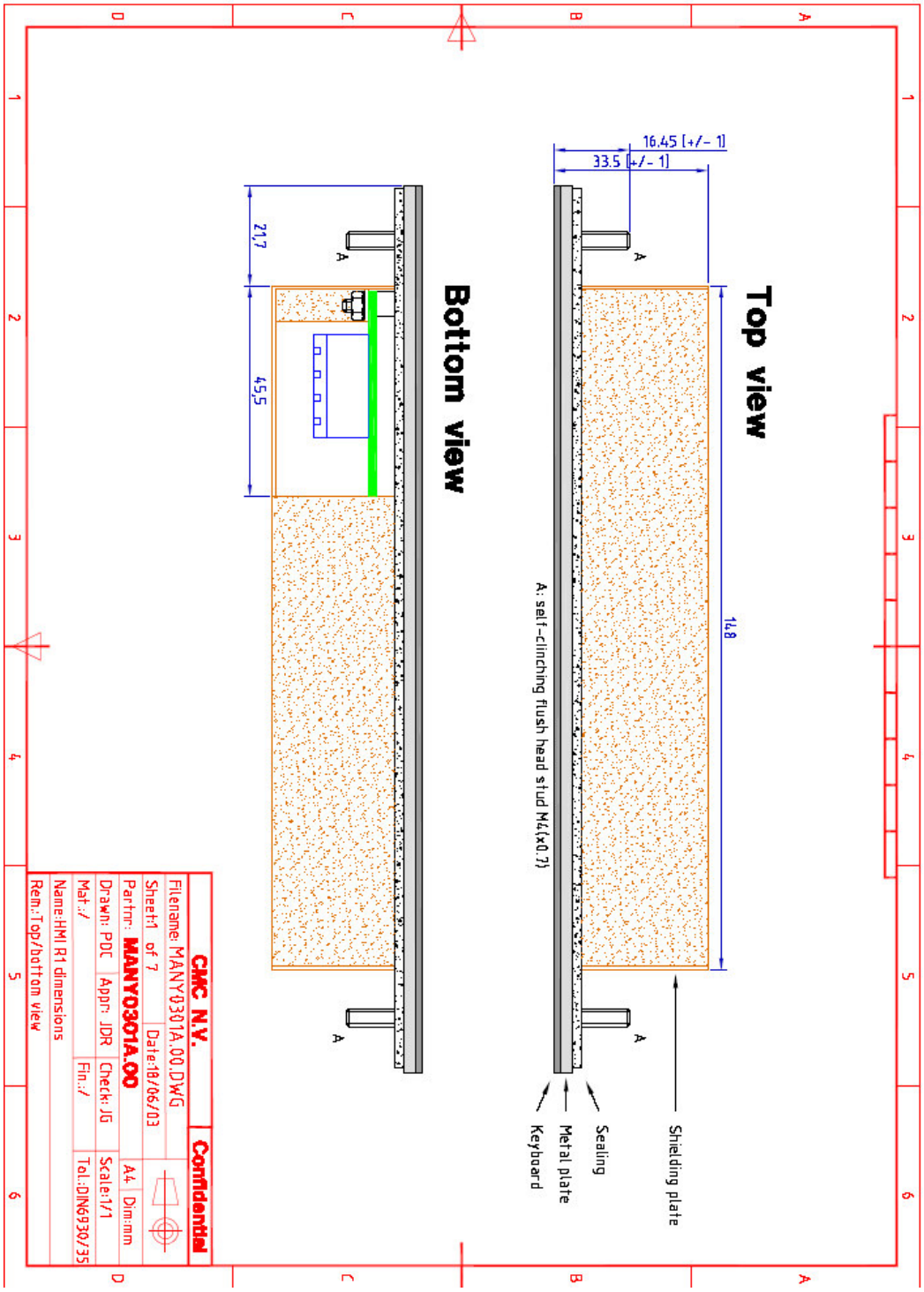
11. Trouble shouting

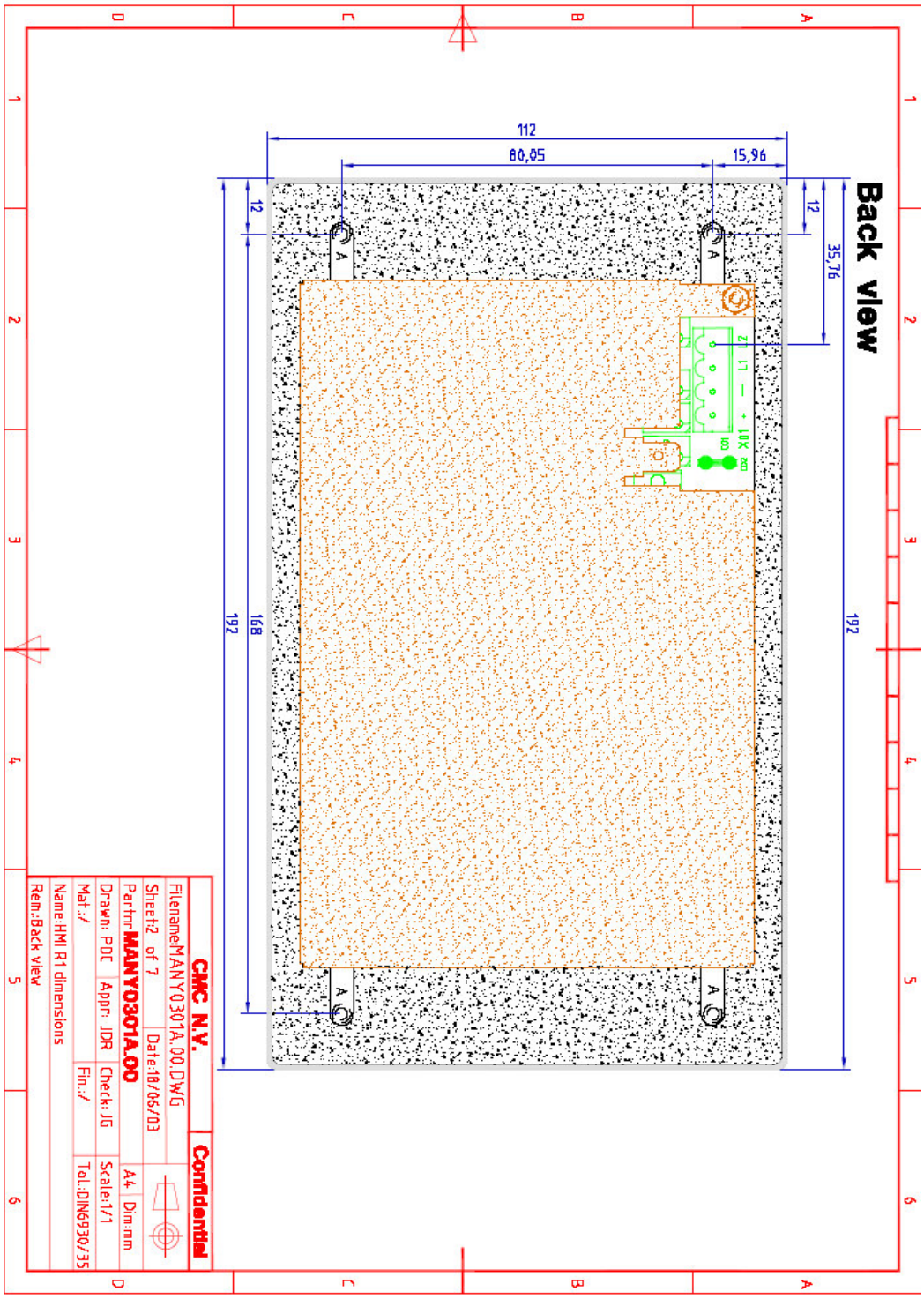
The software has much trouble shouting capabilities. These will not be explained in this document. Please refer to the “Airmaster R1 software specifications” for more information.

In case of a problem with a controller under warranty please follow the procedure, which can be asked at simple request. Please add as much information as possible regarding the fault and the circumstances of occurrence.

Appendix 1: Dimensions and mounting of standard HMI unit

(note: discard the scale on the drawings)




Back view
112
80,05
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CMC N.V.
Confidential
Filename:MANY0301A.00.DWG
Sheet:2 of 7
Date:18/06/03
Partnr:MANY0301A.00
A4
Dim:mm
Drawn: PDC
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Scale:1/1
Mat:-/-
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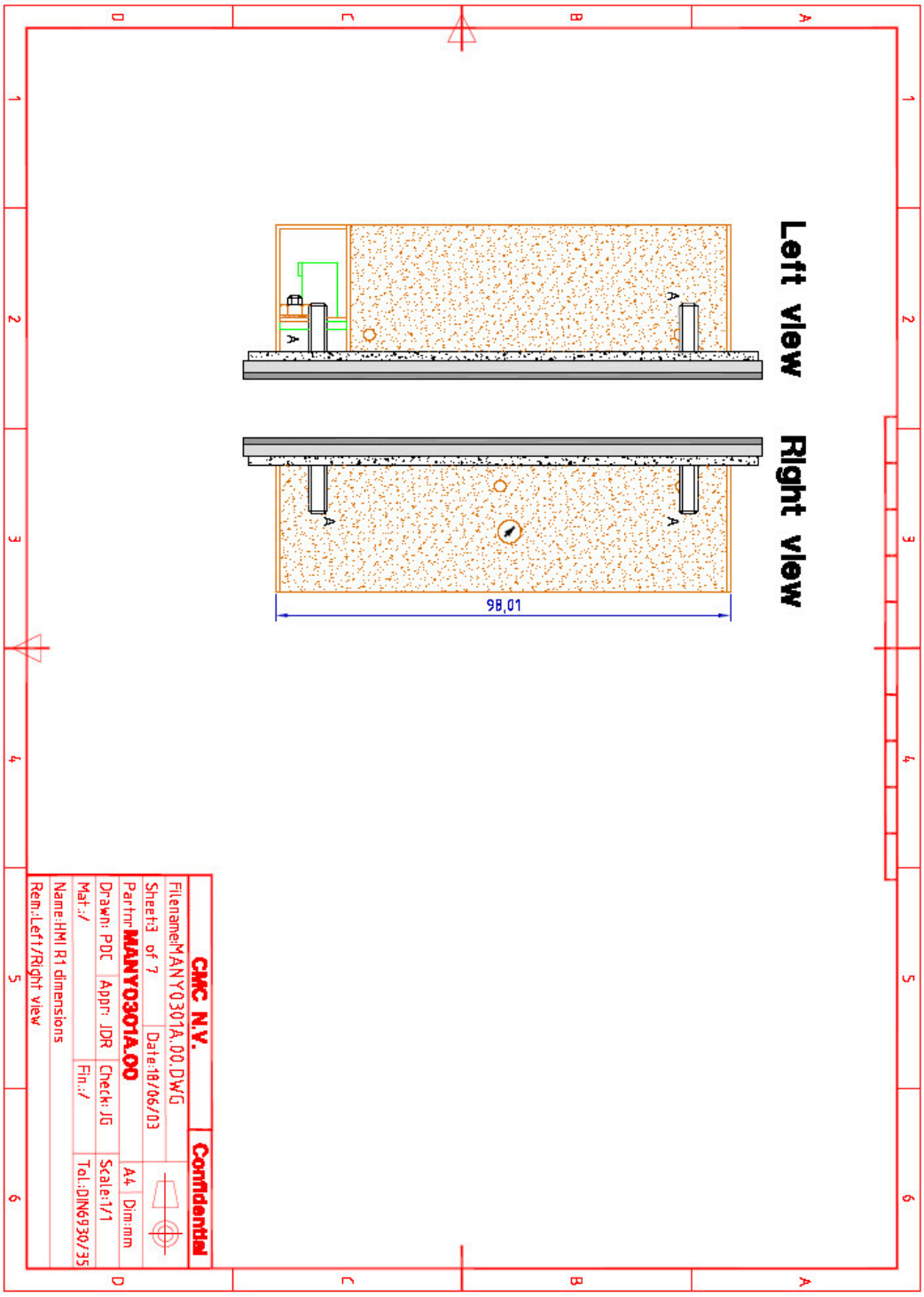
Tol.:DIN6930/3S
Name:HMI R1 dimensions
Rem:Back view


Left view
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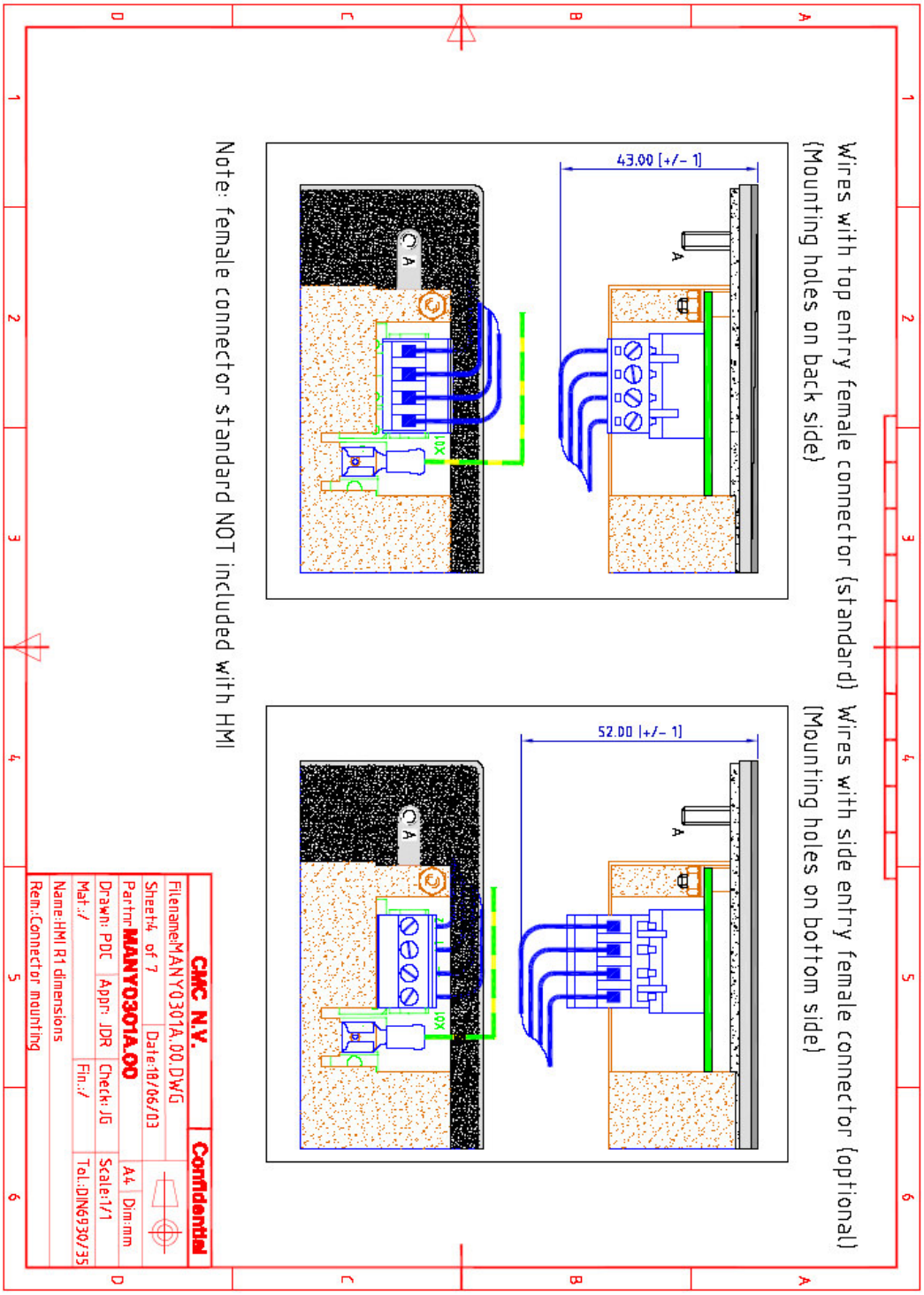
Sheet:3 of 7
Date:18/06/03
Partnr:MANY0301A.00
A4
Dim:mm
Drawn: PDC
Appr: JDR
Check: JG
Scale:1/1
Mat:-/-
Fin.:-/-
Tol.:DIN6930/35
Name:HMI R1 dimensions
Rem:Left/Right view


Wires with top entry female connector (standard)
(Mounting holes on back side)
43.00 [+/- 1]
Wires with side entry female connector (optional)
(Mounting holes on bottom side)
52.00 [+/- 1]
Note: female connector standard NOT included with HMI
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Sheet:4 of 7
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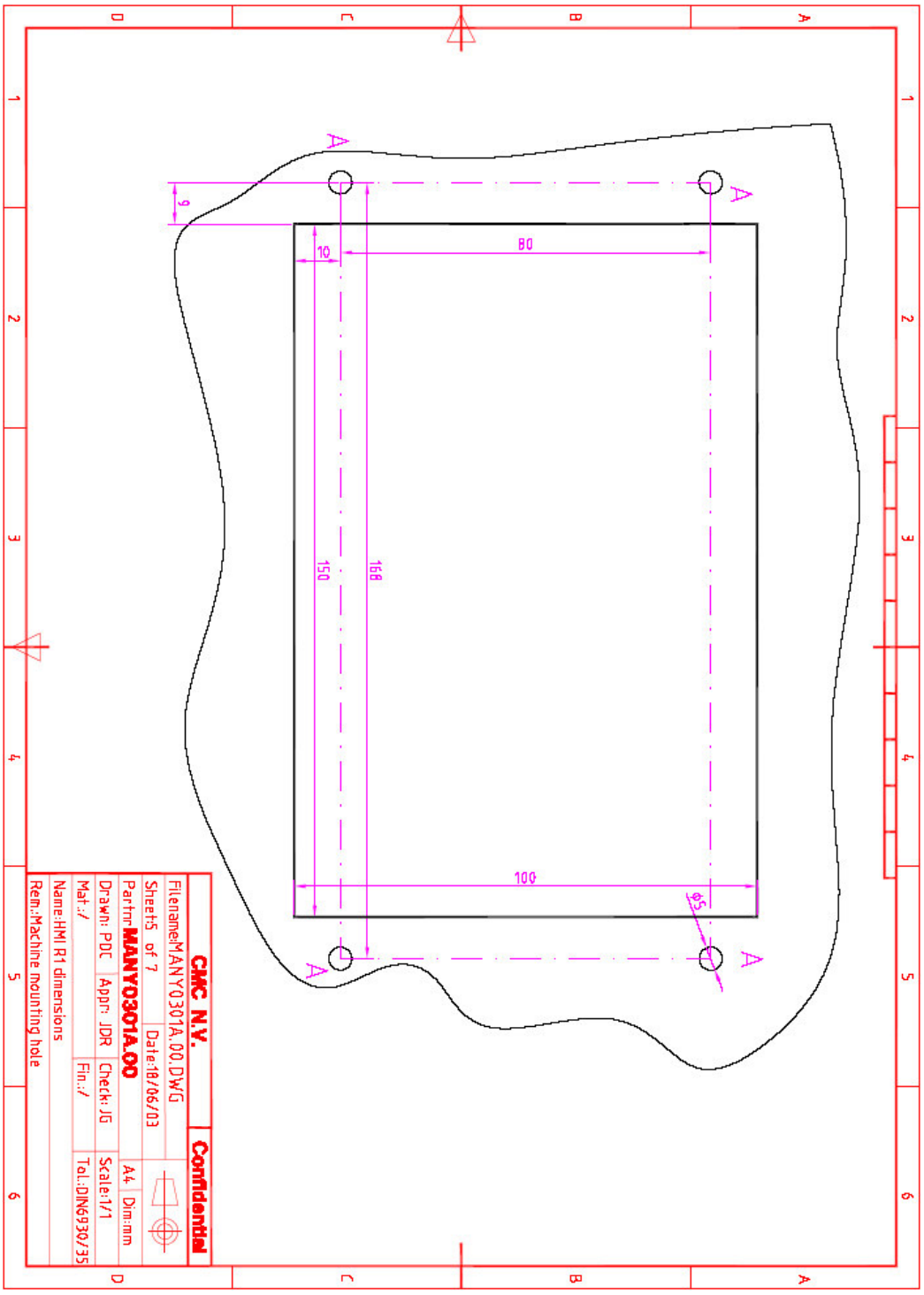
Name:HMI R1 dimensions
Rem:Connector mounting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Filename:MANY0301A.00.DWG
Sheet:5 of 7
Date:18/06/03
Partnr:MANY0301A.00
Drawn: PDC
Appr: JDR
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Mat:-/
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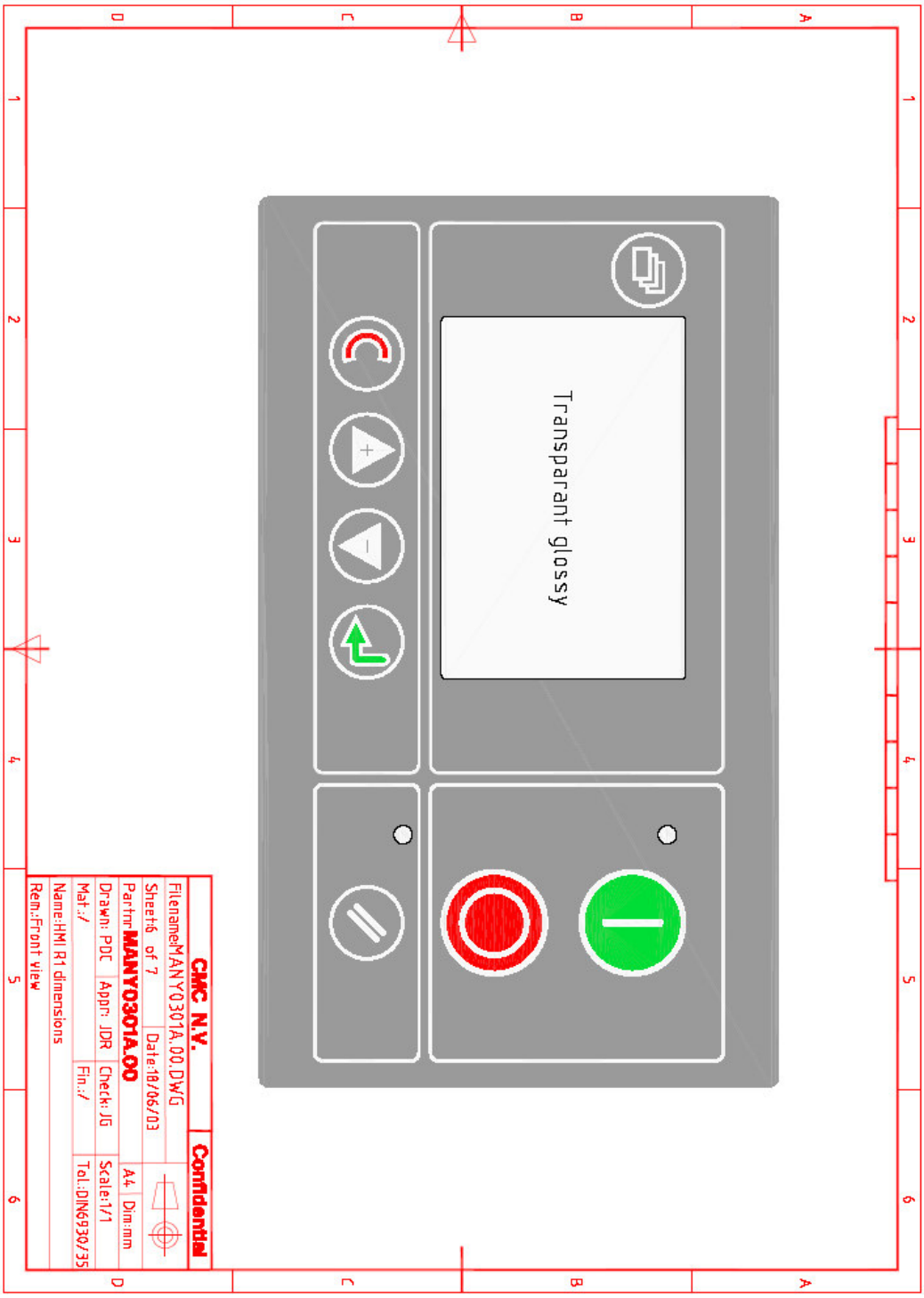
A4
Dim:mm
Scale:1/1
Tol.:DIN6930/35
Name:HMI R1 dimensions
Rem.:Machine mounting hole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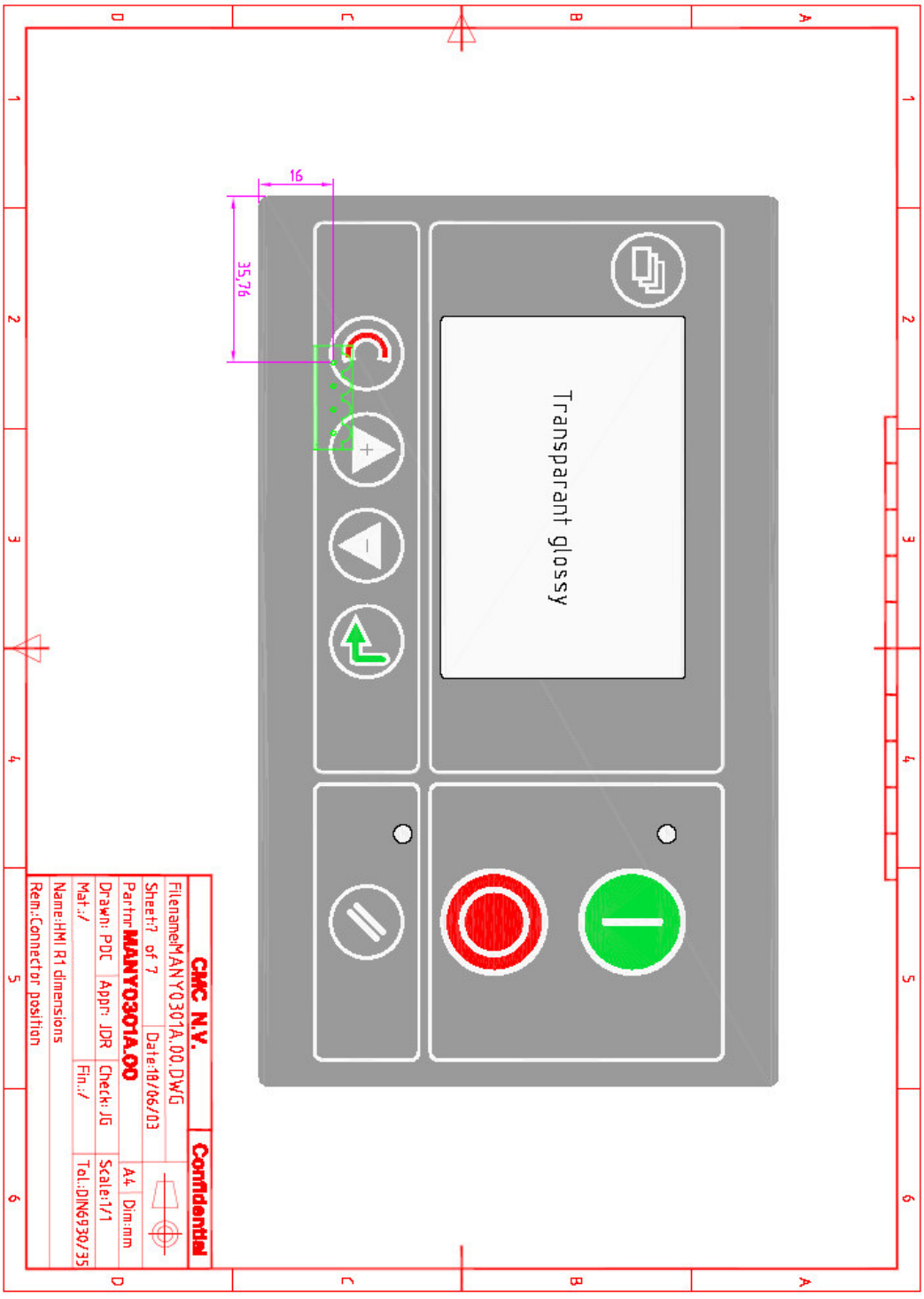
Name:HMI R1 dimensions
Rem:Front view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Transparant glossy
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Confidential
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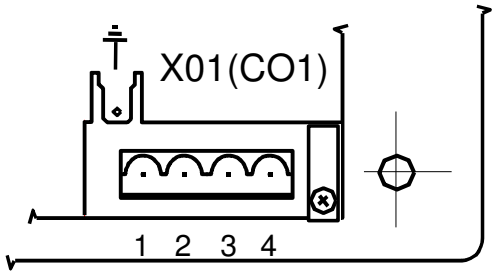
Partnr:MANY0301A.00
A4
Dim:mm
Drawn: PDC
Appr: JDR
Check: JG
Scale:1/1
Mat.:/
Fin.:/
Tol.:DIN6930/35
Name:HMI R1 dimensions
Ren:Connector position

Appendix 2: connectors for machine wiring

The module has printed circuit board mounted plugable and screwable Phoenix Combicon (or compatible) connectors.

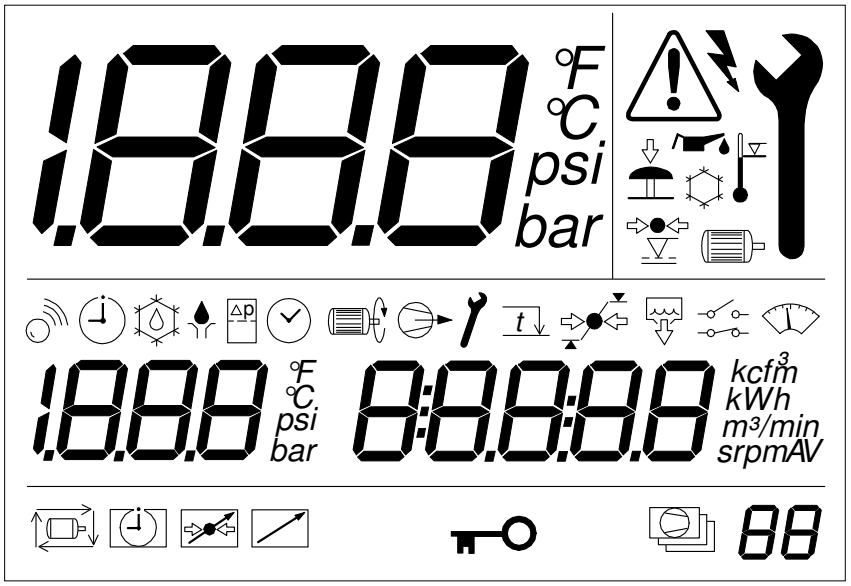
Connector X01: HMI supply and communication connector

Connectortype: 4 pole Phoenix Combicon or compatible with 5.08mm (0.2") pitch



Pin	name	function
1	HMI/+8V	HMI +8V power supply output
2	HMI/GND	HMI supply ground
3	HMI/L1+	HMI RS485 L1+ line
4	HMI/L2-	HMI RS485 L2- line

Appendix 3: Display symbols



Symbols:

	bearing, bearing monitoring
	clock timer, schedule
	dryer, dewpoint temperature
	lubrication, oil, oil level
	air/oil filter, filter differential
	timer, time clock
	motor running
	loaded
	maintenance, service
	time remaining, timer
	upper pressure set point
	lower pressure set point
	condensate drain
	input state, output contact
	analogue value, reading

	power fail auto restart
	clock timer control
	remote pressure control
	remote control
	network address
	sequence function
	locked, no edit, access code

bar, psi	*pressure units*
° C, ° F	*temperature units*
m³/min, cfm	*flow rate*
m³, f³, k f³	*output total cumulative*
kW, kWh	*power, input total cumulative*
%	*percentage*
spm	*bearing monitoring value*
rpm	*revolutions per minute*
h, m, s	*hours, minutes, seconds*
V, mV	*voltage*
A, mA	*ampere*

Note: Symbol combinations can be used.

motor run-on-time