



**MCS Total
Solutions for all your
HVAC/R Control Needs**

MCS-Nitromag Upgrade Brochure Smardt Water Cooled

NEW



Package with Touchscreen



Package with
Industrial Control Panel



Click for Brochure Upgrades▶



This brochure describes a standard upgrade package for the Turbocor series chillers. Each control upgrade installation is unique. It may be necessary to add additional options to the standard upgrade as described in this brochure.

Fill out the brief questionnaire in the back of this brochure and forward to your sales representative for an estimate.

Example MCS-NitroMag Upgrade Photos

Package with Industrial Control Panel

Concerns:

- Old controls failed
- Wanted controls that were easier to understand and greater reliability, plus better and clear information

Equipment:

- Smardt and other brands Water Cooled Chillers
- One to Four Turbocor Compressors
- One to Four Staging Valves
- Load balancing EXV control
- Modulating condenser water valve

Steps Taken:

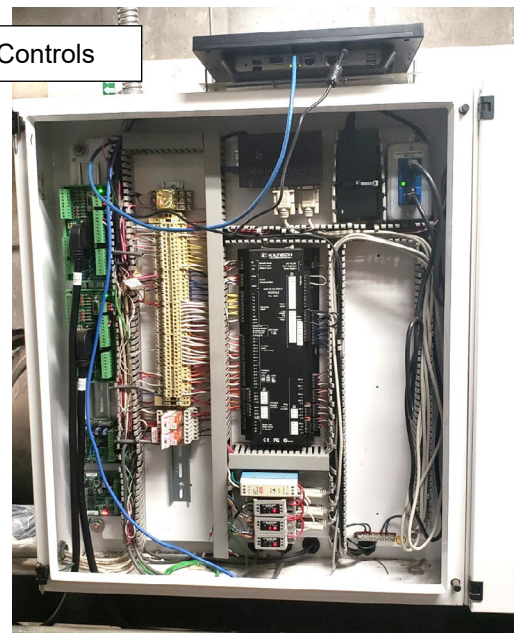
- Remove existing controls
- Install MCS controls
- Reprogram boards for communication
- Provide on-site training and support for contractor to better understand MCS controls.

Results:

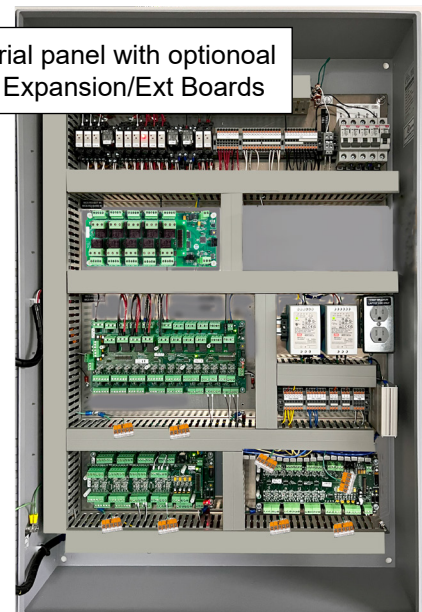
One Smardt Chiller upgraded with MCS controls and one satisfied customer who is very happy with all the information and data available compared to the competitor's controls.



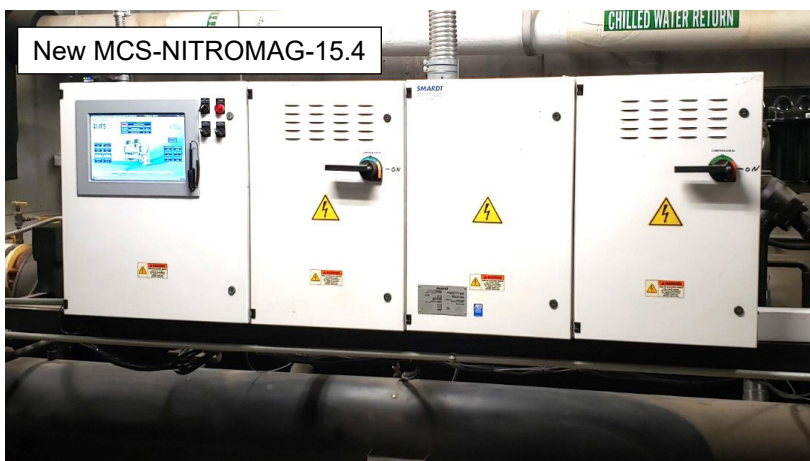
Old Controls



Industrial panel with optional MCS Expansion/Ext Boards



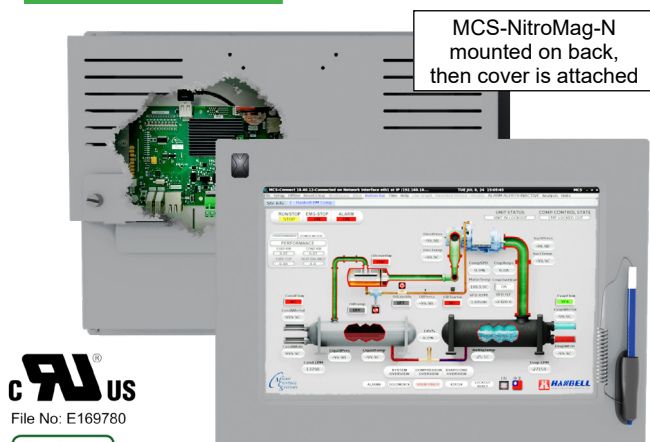
New MCS-NITROMAG-15.4





MCS-NitroMag-15.4

Description & Specifications



Part # MCS-NitroMag-15.4

Description

The **MCS-NitroMag-15.4** is a control system containing a Capacitive Touchscreen, and a MCS-NitroMag-N controller. It includes a processor, memory, eMMC Flash, and supporting power circuitry. The Broadcom quad-core processor on the MCS-NitroMag-N delivers a blazing speed of 1.5GHz.

The MCS-NitroMag-N controller connects with MCS Expansion boards and Extension boards, allowing for a maximum of 144 SI inputs, 90 RO outputs, and 36 AO outputs.

The Capacitive touchscreen interface designed to simplify user access with the MCS Expansion Boards and utilizing MCS-Connect to provide both graphics and service mode access to technicians. Highly accurate and does not require calibration - easy to clean glass surface. Works outdoors, bright screen, water resistant, Exceptional Optics - 1280x800 resolution, sharp and vibrant images.

MCS-NitroMag-15.4 comes pre loaded with the MCS-CONNECT program that allows you to view the 'unit's status', 'extended history', 'alerts', 'alarms', setpoints, and more, all in a user-friendly graphic format.

The MCS-NitroMag-15.4 comes with a built-in WiFi interface for Ethernet connectivity, and an onboard WiFi antenna connection mounted on the front of the touchscreen.

It features various connections ports for:

- 2 HDMI ports (1 Standard and 1 Micro port)
- WiFi antenna connection
- 12vdc power input connection
- Ethernet port (10Mbps/100 Mbps/1 GHz)
- MCS-IO port for communicating with expansion boards.

Includes a MODBUS interface which enables it to act as a Modbus Master using the Modbus RTU protocol, allowing communication with Modbus slave devices for parameter access.

Specifications

Dimensions..... 17"L x 12.11"W x 3.228"H
432mm L x 308mm W x 82mm H

Mounting

Door Mount.Template included
10 mount studs thru customers enclosure.
MS4745 silicone gasket
NEMA 4 IP66 rated
Indoor or outdoor (Mounted in Nema4 Enclosure)
VESA Mount 75 x 75 or 100 x 100 mm (indoor only)
LCD Screen..... 15.4" (16:10 Diagonal)
16.2 Million Colors
1280x800 Resolution
View Angle 70°U, 70°D, 70°L, 70°R
Capacitive Stylus pen
White LED Backlight (Min Life 50,000 Hrs)
Luminance Min. 350 Min. 450 Typical
Touchscreen Surface..... UV Degradation Protection
Operating Temperature..... -22°F to 176°F (-30°C to +80°C)
Operating Humidity.....90 %RH (Non Condensing)
Storage Temperature..... -22°F to 176°F (-30°C to +80°C)

Controller

Microprocessor..... Broadcom BCM2711 Quad core
Cortex (ARMv8) 64-bit SoC @ 1.5Ghz

INPUT	MINIMUM	NOMINAL	MAXIMUM
VOLTAGE	10	12	12.5
AMPS			2

Flash Memory 16 GB EMMC
RAM 2 GB DDR3
MCS-I/O Comm Port. 1 @ 38,400 baud
RS-485 Ports..... 2 @ go up to 115200 baud rate
Ethernet..... 10Mbps/100Mbps/1Gbps
HDMI 2 HDMI 2.0 ports-Standard and Micro
WiFi 2.4 GHz, 5.0GHz 8.02 b/g/n/ac wireless
USB 2 USB type B 2.0 ports 480Mbps signalling
Protocols..... BACnet IP, BACnet MSTP, Modbus IP,
Modbus RTU Slave, Modbus RTU Master
(BTL certification pending)

Real Time Clock Battery backup(Type BR2032)

Power Detection Automatic power fail reset

POWER SUPPLY NOT INCLUDED

Packaging

Ship Weight.....2.00 lb (approx)

Box Dimensions..... 20-1/8" x 15-1/8" x 6-1/2" (approx)

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Revision - 2025-07-30



MCS-NitroMag-MLB-15.4 INDUSTRIAL CONTROL PANEL



Part #
MCS-NITROMAG-MLB-15.4*

Description

The **MCS-NitroMag-MLB-15.4 Industrial Control Panel** is made of powder coated aluminum for durability and longevity. A left hand swing door is mounted with three eight-inch hinges for strength. A key lock is provided for security on the door while still giving easy access of the display. This panel is intended for use in an environment protected from the weather.

The **MCS-NitroMag-MLB-15.4** is a control system containing a Capacitive Touchscreen, MCS-NITROMAG Controller, MCS-IO-BASE, MCS-IO-EXT. It includes a processor, memory, eMMC Flash, and supporting power circuitry.

Panel includes the following; 20A, and a 5A Single-Pole Circuit Breaker, a 5 port 10/100/1000 Ethernet Workgroup Switch Industrial rated, Red Alarm Indicator, Yellow Warning Indicator, Emergency Stop Switch and HAND/OFF/AUTO selector Switch.

The MCS-NITROMAG controller comes with a built-in WiFi interface for Ethernet connectivity, and an onboard WiFi antenna connection mounted on the front of the touchscreen.

It features various connections ports for:

- 2 HDMI ports (1 Standard and 1 Micro port)
- 12vdc & 24vdc power input connections
- Ethernet port (10Mbps/100Mbps/1 GHz)
- MCS-IO port for communicating with expansion boards

Includes a MODBUS interface which enables it to act as a Modbus Master using the Modbus RTU protocol, allowing communication with Modbus slave devices for parameter access. Power is supplied using a MCS-12V-90W power supply.

There is also an electrical outlet for laptop plug-in power at the panel.

Packaging

Weight 60 lbs(approx)
Box 24" x 10" x 30"

Specifications

NEMA Rating – Type 2 Control Panel

Enclosure is intended for indoor use primarily to provide a degree of protection against contact with the enclosed equipment and is not protected from liquids.

Industrial Control Panel

Dimensions 23.5" w x 32.65" h x 8" d
Mounting Holes Mounts with four pre drilled
15/32" holes
Rated Voltage (Standard) 120VAC or 230VAC
Phase / Frequency 1 Phase / 60Hz
Full Load Current(approx) 40A at 120VAC or 20A at 240VAC
Short Circuit Current Rating . 10kA

Temp. Range for Control Panel & Touch Screen

LCD Screen 15.4" (16:10 Diagonal)
16.2 Million Colors
1280x800 Resolution
View Angle 70°U, 70°D, 70°L, 70°R
Capacitive Stylus pen
White LED Backlight (Min Life 50,000 Hrs)
Luminance Min. 350 Min. 450 Typical
Touchscreen Surface UV Degradation Protection
Operating Temperature -22°F to 176°F (-30°C to +80°C)
Operating Humidity 90 %RH (Non Condensing)
Storage Temperature -22°F to 176°F (-30°C to +80°C)

Controller

Microprocessor Broadcom BCM2711 Quad core
Cortex (ARMv8) 64-bit SoC @ 1.5Ghz

INPUT	MINIMUM	NOMINAL	MAXIMUM
VOLTAGE	10	12	12.5
AMPS			2

Flash Memory 16 GB EMMC
RAM 2 GB DDR3
MCS-I/O Comm Port. 1 @ 38,400 baud
RS-485 Ports. 2 @ go up to 115200 baud rate
Ethernet 10 Mbps/100Mbps/1Gbps
HDMI 2 HDMI 2.0 ports-Standard and Micro
WiFi 2.4GHz, 5.0GHz 8.02 b/g/n/ac wireless
USB 2 USB type B 2.0 ports 480Mbps signalling
Protocols BACnet IP, BACnet MSTP, Modbus IP,
Modbus RTU Slave, Modbus RTU Master (BTL certification cpendig)
Real Time Clock Battery backup(Type BR2032)
Power Detection Automatic power fail reset

Power Supply - Specification

12vdc power supply 85vac ~ 264vac
AC frequency range 47 ~ 63Hz / 7.5A / 90W
24vdc power supply 85vac ~ 264vac
AC frequency range 47 ~ 63Hz / 4A / 96W

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* Photo shown is an example of an Industrial Control Panel; some optional equipment may be shown.

**The glove needs to have a conductive fabric or material to work with cap touchscreens.

Example Graphics MCS-Nitromag-15.4

Touchscreen

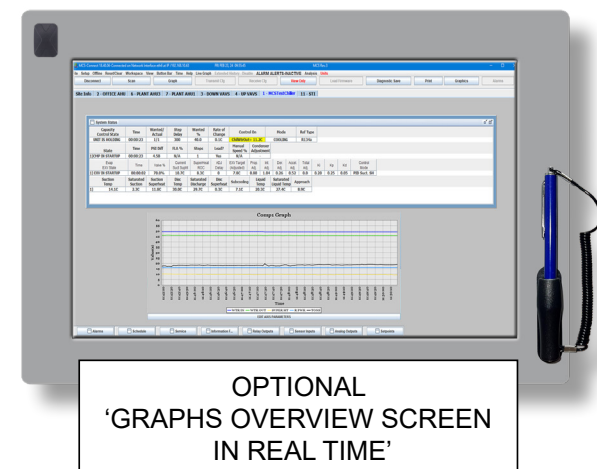
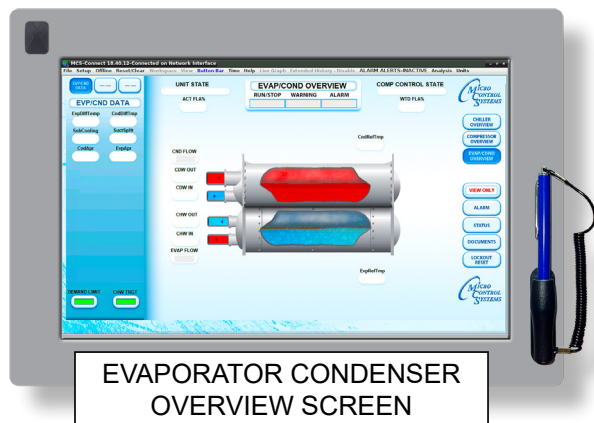
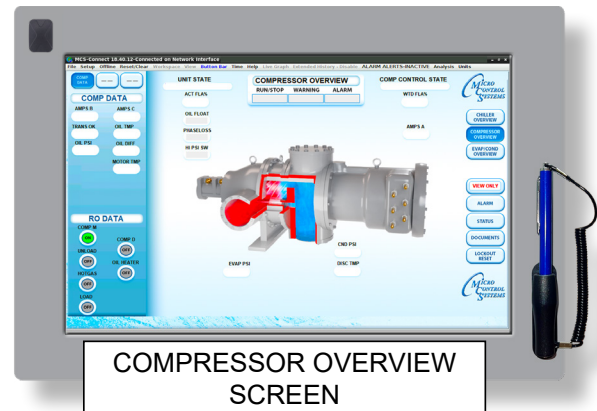
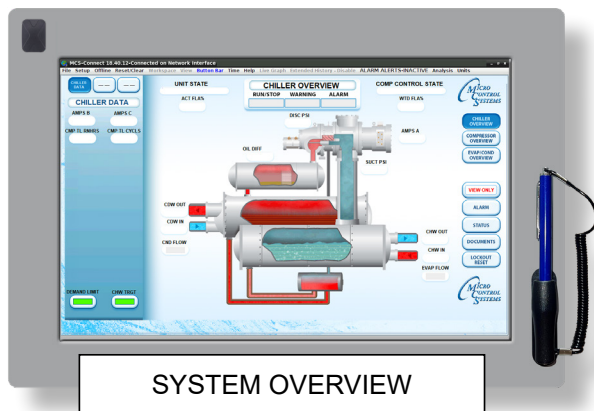
The **MCS-NitroMag-15.4** capacitive touchscreen interface designed to simplify user access with MCS Expansion boards utilizing MCS-Connect to provide both graphics and service mode access to technicians. Input method: Finger, glove, stylus.

Highly accurate and does not require calibration - easy to clean glass surface. Works outdoors, bright screen, water resistant, Exceptional Optics - 1280x800 resolution, sharp and vibrant images.

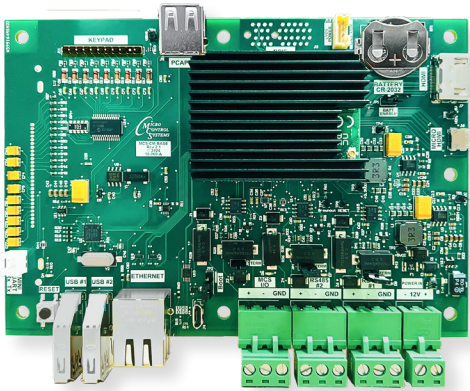
MCS-MCS-NitroMag-15.4 comes preloaded with the MCS-CONNECT program that allows you to view the 'unit's status', 'extended history', 'alerts', 'alarms', setpoints, and more, all in a user-friendly graphic format.

Standard screens include:

- **SYSTEM OVERVIEW, COMPRESSOR OVERVIEW and EVAPORATOR/CONDENSER OVERVIEW**



Example Typical Upgrade with Optional Boards



MCS-NitroMag-N

The **MCS-NitroMag-N** is a control system containing a processor, memory, eMMC Flash, and supporting power circuitry. The Broadcom quad-core processor delivers a blazing speed of 1.5GHz.

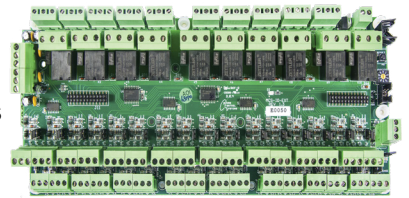
The MCS-NitroMag-N controller connects with MCS Expansion boards and Extension boards, allowing for a maximum of 144 SI inputs, 90 RO outputs, and 36 AO outputs.

The MCS-NitroMag-N comes with a built-in WiFi interface for Ethernet connectivity, and an onboard WiFi antenna connection.

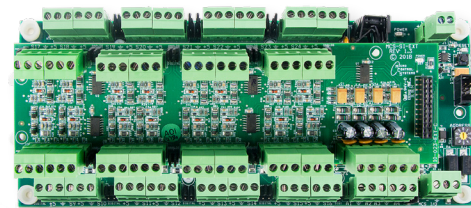
MCS-IO-Base & MCS-IO-EXT

MCS-IO-BASE has a stand-alone microprocessor which communicates with a MCS-NitroMag over the MCS-I/O port at 38,400 baud. The MCS-IO-BASE has 16 SI inputs, 10 RO outputs, and 4 AO outputs. All data is check summed with auto error correction. Each MCS-IO-BASE board can be powered by a 12VDC regulated power supply and has a automatic power fail reset system.

The **MCS-IO-EXT** provides a flexible and cost effective way to allow relay output, sensor input and analog output expansion for MCS-NitroMag. Each MCS-IO-EXT can be paired with a MCS-IO-BASE to double the number of inputs and outputs.



MCS-SI-Base & MCS-SI-EXT



board can be powered by a 12VDC regulated power supply and has a automatic power fail reset system.

The **MCS-SI-EXT** provides a flexible and cost effective way to allow sensor input and analog output expansion for the **MCS MAGNUM**. Each MCS-SI-EXT can be paired with a MCS-SI-BASE to double the number of inputs and outputs.

The **MCS-SI-BASE** provides a flexible and cost effective way to allow sensor input and analog output expansion for the **MCS-NitroMag**. Each MCS-SI-BASE has a stand-alone microprocessor which communicates with the MCS-Nitromag over the MCS-I/O port at 38,400 baud. The MCS-SI-BASE has 16 SI inputs and 4 AO outputs. All data is check summed with auto error correction. MCS-SI-BASE

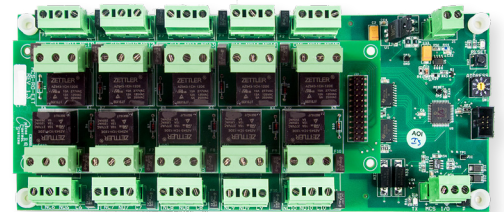
MCS-RO-Base & MCS-RO-EXT

The **MCS-RO-BASE** provides a flexible and cost effective way to allow relay output expansion for the **MCS-Nitromag**. Each MCS-RO-BASE has a stand-alone microprocessor which communicates over the MCS-I/O port at 38,400 baud. All data is check summed with auto error correction. Because the communication is over a RS-485 long distance two-wire differential network transmission system, the MCS-RO-BASE may be located up to 5,000 feet away.

The MCS-RO-BASE board is powered by a 12VDC regulated power supply.

The **MCS-RO-EXT** provides a flexible and cost effective way to allow relay output expansion for the **MCS NitroMag**.

Each MCS-RO-EXT can be paired with a MCS-RO-BASE to double the number of outputs.



Example Typical Control Upgrade

MCS-PRESSURE TRANSDUCERS



The **MCS Pressure Transducers** are one of the most economical and durable options on the market for dealing with high-pressure industrial applications.

In addition to being CE and UL approved, MCS transducers are capable of surviving high vibration. They include a cavity built out of solid 17-4 PH stainless steel 1/4" SAE Female Flare fitting & Schrader valve; 7/16-20 UNF pipe thread which creates a leak-proof, all metal sealed system that makes the transducers ideal for use with rugged HVAC environments.

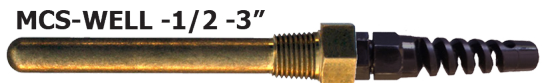
MCS-T100



An extremely fast acting temperature sensor built for demanding environments. It is ideal for high moisture locations with continuous freeze and thaw cycles. The sensor is potted with a thermally conductive RTV Cure Silicon Adhesive to guarantee durability and response. Its high accuracy allows for interchangeability in the field. The large resistance range allows the use of over 1000' of cable with no noticeable effect. The MCS-T100 sensor has the ability to move from 32°F to 212°F in approximately 10 to 15 seconds.

MCS-Wells/Tubes

The MCS-WELL was designed to be used with the MCS-T100 temperature sensor, although it has other applications. It is used in the 23XL series chillers in the chilled water and condenser water lines. It comes pre-filled with heat conductive compound to aid in temperature to the sensor.



1/4- 2.5"

The **MCS-TUBE** can be epoxied to a discharge or suction line on the 23XL series chillers in order to obtain temperature readings without the use of a well. It was designed to be used with the MCS-T100 temperature sensor and comes pre-filled with heat conductive compound to aid in transferring temperature to the sensor.

MCS-USB-RS485



The **MCS-USB-RS485** is a USB to RS485 cable that provides a fast simple way to connect a **MCS-MAGNUM** to a Laptop or PC.

The MCS-USB-RS485 cable contains a small internal electronic circuit board, which converts USB to RS485 with LED indicators for transmit (TX=Red) and receive (RX=Green).

Example Typical Control Upgrade

MCS-EPOXY

- Pre-measured resins and hardeners in one tube
- Easy to use - bonds, seals, plugs, molds and rebuilds
- No special tools needed
- Can even harden under water



- Pressure tested to 1300 psi
- Temperatures up to 500 degree F
- Color..... Gray
- Density 15.9 lb/gal (1.9 g/cc)
- Hardness (Shore D) 85
- Tensile Strength 6000 psi
- Compressive Strength 18,000 psi
- Modulus of Elasticity 6×10^5 psi
- Shear Strength 700 psi

MCS-CT500

MCS-CT500 current sensor monitors current flowing to electrical equipment. The magnitude of the current is converted to a linear output voltage between 0.06 to 4.52vdc which can be read as a standard analog input signal. The signal is used by MCS micro controllers for the following:

1. For slide valve control on screw machines
2. For high amp motor overload protection
3. For verification of device on / off

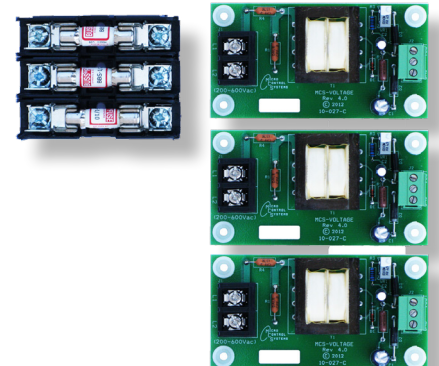


RoHS
Compliant

MCS-VOLTAGE-3PH

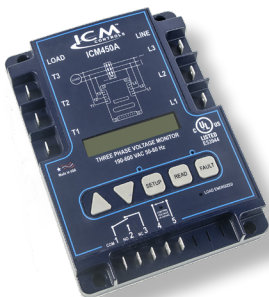
The **MCS-VOLTAGE-3PH** measures AC voltage between 200-600 AC. It is designed to monitor the voltage of each phase of the main input power to the unit.

The MCS-VOLTAGE-3PH sensor provides three separate DC voltage outputs that correspond to the AC voltage it is measuring.



MCS-PHASE-B

The **MCS-PHASE-B** is a programmable 3-phase line voltage monitor, high temperature LCD display, easy setup and clear diagnostic readout of system faults. The MCS-PHASE-B was specifically designed to protect motors and other 3-phase loads from premature failure and damage due to common voltage faults such as unbalance, over/under voltage, phase loss, reversal, incorrect sequencing and rapid short cycling.



Example Typical Points list with optional boards

Relay Outputs (MCS-IO-BASE)

#	Output Name	Type	Description
1-1	SPARE 1-1	Standard	Relay output not used
1-2	SPARE 1-2	Standard	Relay output not used
13	SPARE 1-3	Standard	Relay output not used
1-4	SPARE 1-4	Standard	Relay output not used
1-5	SPARE 1-5	Standard	Relay output not used
1-6	Cmp1I-Lock	Standard	Comp 1 J2 TurboCor Interlock
1-7	Cmp2I-Lock	User Logic	Comp 2 J2 TurboCor Interlock
1-8	Cmp3I-Lock	User Logic	Comp 3 J2 TurboCor Interlock
1-9	Warning	Standard	Warning Light: unit is in a safety condition prior to a safety shutdown
1-10	Alarm	Standard	Alarm Light: unit is in a safety shutdown

Relay Outputs (MCS-IO-EXT)

2-1	Comp 1	Step w\ EXV	Compressor 1 Run Enable
2-2	SPARE 2-2	Standard	Relay output not used
2-3	SPARE 2-3	Standard	Relay output not used
2-4	SPARE 2-4	Standard	Relay output not used
2-5	SPARE 2-5	Standard	Relay output not used
2-6	SPARE 2-6	Standard	Relay output not used
2-7	SPARE 2-7	Standard	Relay output not used
2-8	SPARE 2-8	Standard	Relay output not used
2-9	SPARE 2-9	Standard	Relay output not used
2-10	SPARE 2-10	Standard	Relay output not used

Relay Outputs (MCS-RO-BASE)

3-1	Comp 2	Step w\ EXV	Compressor 2 Run Enable
3-2	SPARE 3-2	Standard	Relay output not used
3-3	SPARE 3-3	Standard	Relay output not used
3-4	SPARE 3-4	Standard	Relay output not used
3-5	SPARE 3-5	Standard	Relay output not used
3-6	SPARE 3-6	Standard	Relay output not used
3-7	SPARE 3-7	Standard	Relay output not used
3-8	SPARE 3-8	Standard	Relay output not used
3-9	SPARE 3-9	Standard	Relay output not used
3-10	SPARE 3-10	Standard	Relay output not used

Example Typical Points list with optional boards

Relay Outputs (MCS-RO-EXT)

#	Output Name	Type	Description
4-1	Comp 3	Step w\ EXV	Compressor 3 Run Enable
4-2	SPARE2-2	Standard	Relay output not used
4-3	Cmp1Alarm	Standard	Comp 1 In Alarm Output
4-4	Cmp2Alarm	Standard	Comp 2 In Alarm Output
4-5	Cmp3Alarm	Standard	Comp 3 In Alarm Output
4-6	SPARE4-6	Standard	Relay output not used
4-7	SPARE4-7	Standard	Relay output not used
4-8	SPARE4-8	Standard	Relay output not used
4-9	SPARE4-9	Standard	Relay output not used
4-10	SPARE4-10	Standard	Relay output not used

Sensor Inputs(MCS-IO-BASE)

#	Output Name	Type	Description
1-1	ChilWtrIn	MCST100	Chilled Water In Temperature
1-2	ChilWtrOut	MCST100	Chilled Water Leaving Temperature
1-3	CndWtrIn	MCST100	Condenser water incoming temperature
1-4	CndWtrOut	MCST100	Condenser water leaving temperature
1-5	CndLevel	User Defined	Condenser Level Sensor
1-6	LoPsi SW 1	DIGITAL	Mechanical Low Psi Switch Comp 1
1-7	HiPsi SW 1	DIGITAL	Mechanical High Psi Switch Comp 1
1-8	LoPsi SW 2	DIGITAL	Mechanical Low Psi Switch Comp 2
1-9	HiPsi SW 2	DIGITAL	Mechanical High Psi Switch Comp 2
1-10	LoPsi SW 3	DIGITAL	Mechanical Low Psi Switch Comp 3
1-11	HiPsi SW 3	DIGITAL	Mechanical High Psi Switch Comp 3
1-12	CndFlow	DIGITAL	Monitors the condenser flow
1-13	ChwFlow	DIGITAL	Monitors the chilled water flow
1-14	Phaseloss	DIGITAL	Phase loss: phase imbalance
1-15	Run/Stop	DIGITAL	Run/Stop/Hand Switch
1-16	Emg/Stop	DIGITAL	Emergency Stop Switch

Example Typical Points list with optional boards

Sensor Inputs (MCS-IO-EXT)

#	Output Name	Type	Description
2-1	Cmp1 Fault	TurboCorFault	Compressor 1 Fault Message
2-2	Ctrl Mode1	ModbusHex	Compressor 1 Control Mode
2-3	IGV Open%	MODBUS	Inlet Guide Vane%-Compressor 1
2-4	SuctPsi 1	MODBUS	Suction Pressure - Compressor 1
2-5	DiscPsi 1	MODBUS	Discharge Pressure - Compressor 1
2-6	CavityTmp1	MODBUS	Cavity Temperature-Compressor 1
2-7	InvertTmp1	MODBUS	Inverter Temperature-Compressor 1
2-8	ChokSpeed1	MODBUS	Choke Speed-Compressor 1
2-9	SurgSpeed1	MODBUS	Surge Speed-Compressor 1
2-10	ActSpeed1	MODBUS	Actual Speed-Compressor 1
2-11	ComPSIRat1	MODBUS	Compressor 1 Pressure Ratio
2-12	Cmp1Amps	MODBUS	Compressor 1 Amperage
2-13	M IGV1STPS	MODBUS	Inlet Guide Vane Steps-Compressor 1
2-14	SPARE 2-14	SPARE	Sensor input not used
2-15	SPARE 2-15	SPARE	Sensor input not used
2-16	SPARE 2-16	SPARE	Sensor input not used

Sensor Inputs (MCS-SI-BASE)

3-1	Cmp2 Fault	TurboCorFault	Compressor 2 Fault Message
3-2	Ctrl Mode2	ModbusHex	Compressor 2 Control Mode
3-3	IGV Open%	MODBUS	Inlet Guide Vane%-Compressor 2
3-4	SuctPsi 2	MODBUS	Suction Pressure - Compressor 2
3-5	DiscPsi 2	MODBUS	Discharge Pressure - Compressor 2
3-6	CavityTmp2	MODBUS	Cavity Temperature-Compressor 2
3-7	InvertTmp2	MODBUS	Inverter Temperature-Compressor 2
3-8	ChokSpeed2	MODBUS	Choke Speed-Compressor 2
3-9	SurgSpeed2	MODBUS	Surge Speed-Compressor 2
3-10	ActSpeed2	MODBUS	Actual Speed-Compressor 2
3-11	ComPSIRat2	MODBUS	Compressor 2 Pressure Ratio
3-12	Cmp2Amps	MODBUS	Compressor 2 Amperage
3-13	M IGV2STPS	MODBUS	Inlet Guide Vane Steps-Compressor 2
3-14	SPARE3 -14	SPARE	Sensor input not used
3-15	SPARE 3-15	SPARE	Sensor input not used
3-16	SPARE 3-16	SPARE	Sensor input not used

Example Typical Points list with optional boards

Sensor Inputs (MCS-SI-EXT)

#	Output Name	Type	Description
4-1	Cmp3 Fault	TurboCorFault	Compressor 3 Fault Message
4-2	Ctrl Mode2	ModbusHex	Compressor 3 Control Mode
4-3	IGV Open%	MODBUS	Inlet Guide Vane%-Compressor 3
4-4	SuctPsi 2	MODBUS	Suction Pressure - Compressor 3
4-5	DiscPsi 2	MODBUS	Discharge Pressure - Compressor 3
4-6	CavityTmp2	MODBUS	Cavity Temperature-Compressor 3
4-7	InvertTmp2	MODBUS	Inverter Temperature-Compressor 3
4-8	ChokSpeed2	MODBUS	Choke Speed-Compressor 3
4-9	SurgSpeed2	MODBUS	Surge Speed-Compressor 3
4-10	ActSpeed2	MODBUS	Actual Speed-Compressor 3
4-11	ComPSIRat2	MODBUS	Compressor 3 Pressure Ratio
4-12	Cmp2Amps	MODBUS	Compressor 3 Amperage
4-13	M IGV2STPS	MODBUS	Inlet Guide Vane Steps-Compressor 3
4-14	SPARE 4-14	SPARE	Sensor input not used
4-15	SPARE 4-15	SPARE	Sensor input not used
4-16	SPARE 4-16	SPARE	Sensor input not used

Sensor Inputs (MCS-SI-BASE#2)

5-1	EvapPsi	MCS-200	Evaporator Pressure
5-2	DiscPsi 1	MCS-500	Discharge Pressure 1
4-3	DiscPsi 2	MCS-500	Discharge Pressure 2
5-4	DiscPsi 3	MCS-500	Discharge Pressure 3
5-5	LiqPsi	MCS-500	Liquid Pressure
5-6	SuctTmp 1	MCST100	Suction Temperature - Compressor 1
5-7	SuctTmp 2	MCST100	Suction Temperature - Compressor 2
5-8	SuctTmp 3	MCST100	Suction Temperature - Compressor 3
5-9	DiscTmp 1	MCST100	Discharge Temperature - Compressor 1
5-10	DiscTmp 2	MCST100	Discharge Temperature - Compressor 2
5-11	DiscTmp 3	MCST100	Discharge Temperature - Compressor 3
5-12	LiqTmp	MCST100	Liquid Temperature
5-13	Disable 1	DIGITAL	Turns Off Compressor 1
5-14	Disable 2	DIGITAL	Turns Off Compressor 2
5-15	Disable 3	DIGITAL	Turns Off Compressor 3
5-16	Ambient	MCST100	Outdoor Air Temperature

Example Typical Points list with optional boards

Sensor Inputs (MCS-SI-EXT#2)

#	Output Name	Type	Description
6-1	Net R/S	BMS RUN	Building Management interface Run/Stop
6-2	NetReset	BMS CW RSET	Building Management interface target reset
6-3	NetDmdLmt	BMS Dmd FLA%	Building Management interface for Demand %
6-4	SPARE 6-4	SPARE	Sensor input not used
6-5	SPARE 6-5	SPARE	Sensor input not used
6-6	SPARE 6-6	SPARE	Sensor input not used
6-7	SPARE 6-7	SPARE	Sensor input not used
6-8	SPARE 6-8	SPARE	Sensor input not used
6-9	SPARE 6-9	SPARE	Sensor input not used
6-10	SPARE 6-10	SPARE	Sensor input not used
6-11	SPARE 6-11	SPARE	Sensor input not used
6-12	SPARE 6-12	SPARE	Sensor input not used
6-13	SPARE 6-13	SPARE	Sensor input not used
6-14	SPARE 6-14	SPARE	Sensor input not used
6-15	SPARE 6-15	SPARE	Sensor input not used
6-16	SPARE 6-16	SPARE	Sensor input not used

Analog Outputs (MCS-IO-BASE)

#	Output Name	Description
1-1	Exv%	Electronic Expansion Valve Control Signal
1-2	StgValve1%	Compressor 1 Staging Valve
1-3	StgValve2%	Compressor 2 Staging Valve
1-4	StgValve3%	Compressor 3 Staging Valve

Analog Outputs (MCS-IO-EXT)

1-1	Demand 1%	Compressor 1 Speed Demand
1-2	SPARE1-2	Analog input not used
1-3	SPARE1-3	Analog input not used
1-4	SPARE1-4	Analog input not used

Example Typical Points list with optional boards

Analog Outputs (MCS-SI-BASE)

2-1	Demand 2%	Compressor 2 Speed Demand
2-2	SPARE2-2	Analog input not used
2-3	SPARE2-3	Analog input not used
2-4	SPARE2-4	Analog input not used

Analog Outputs (MCS-IO-EXT)

3-1	Demand 3%	Compressor 2 Speed Demand
3-2	SPARE2-2	Analog input not used
3-3	SPARE2-3	Analog input not used
3-4	SPARE2-4	Analog input not used

Sample Questionnaire

Visit <https://www.mcscontrols.com/brochures.html> for a fillable form to email to sales@mcscontrols.com

General Information

Company: _____ Phone: _____
Name: _____ Title: _____ Email: _____
Mobile: _____ Site: _____

Unit Information

Installation Site Name _____
Model # _____ Unit Serial # _____ Site Unit # _____
What is the Voltage of the Unit? ☐ 208V, ☐ 230V, ☐ 460V, ☐ 4160V, Other Voltage _____
What is the Control voltage in the unit? ☐ 24V, ☐ 115V, ☐ 230V, What type of Refrigerant is being used? _____
Is MCS monitoring Main Voltage? ☐ Yes ☐ No. Will Phase loss need to be monitored? ☐ Yes ☐ No.

Network Information

1. Integrating to Building Management System (BMS) ☐ Yes ☐ No, If yes, complete the form provided on page 2.

Motor Information

2. What is the Starter Type? _____, Are we monitoring the transition OK or Start Fault? _____
a. Does the Compressor have a remote starter? ☐ Yes ☐ No.
3. Is there a Variable Frequency Drive? ☐ Yes ☐ No
a. What is the VFD Make and Model? VFD Make _____ VFD Model _____
b. Will the VFD be hardwired to MCS controls, or MODBUS _____
c. Is MCS required to control VFD Cabinet Auxiliary Fan? ☐ Yes ☐ No.
4. What are the Motor "RUN LOAD AMPS"(FLA)? COMP 1: _____ COMP 2: _____
5. Is Hot Gas Bypass present? ☐ Yes ☐ No, How does it operate? _____

Purge Information

6. What is the Purge Type on the unit, how is it controlled? _____

Evap/Condenser/Pump Information

7. Is MCS controlling the chiller Water Pump(s)? ☐ Yes ☐ No, How will they be wired? _____
8. Is MCS controlling the Condenser water Pump(s)? ☐ Yes ☐ No, How will they be wired? _____
9. Is MCS controlling Condenser/Evaporator Isolation Valve? ☐ Yes ☐ No ☐ BMS.
10. Is MCS controlling tower fan(s)? ☐ Yes ☐ No, How many are there _____, how are they wired? _____
11. Will the Chilled/Condenser Water Flow be measured by? _____

Ambient Information

12. Will Ambient temperature need to be monitored? ☐ Yes ☐ No.

CVHA Information Only

13. Is there a Motor Cooler? ☐ Yes ☐ No, Will MCS be monitoring the Oil Feed? ☐ Yes ☐ No, Return Temp _____

COMMENTS (Is there any other information we need to know?):

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