MICRO CONTROL SYSTEMS

MCS Total Solutions for all your HVAC/R Control Needs

MCS-NITROMAG-CENT
Industrial Control Panel

NEW

MCS-Nitormag Upgrade Brochure Trane CVHE-F with Optional VFD Control

Click for Brochure Upgrades▶

This brochure describes a standard upgrade package for the CVHE-F Chiller.

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

Revision - 2025-08-19

CVHE-F Control Enclosure Upgrade

CVHE Chiller controls before upgrading

After upgrading to MCS-NITROMAG-CENT Controls

NEW - MCS-CONTROLS for CVHE-F

Upgrade Specications

MCS NitroMag-Centrifugal

Industrial Control Panel

The **MCS-NITROMAG-CENTRIFUGAL** is a control system containing a Capacitive Touchscreen, MCS-NITROMAG Controller, MCS-IO-BASE, MCS-IO-EXT, MCS-SI-BASE, MCS-SI-EXT and a MCS-RO-BASE. It includes a processor, memory, eMMC Flash, and supporting power circuitry.
Control panel includes the following; 20A, 16A and a 5A Single-Pole Circuit Breaker. A 5-port 10/100/1000 Mbps Ethernet Workgroup Switch Industrial rated, Red Alarm Indicator, Yellow Warning Indicator, Emergency Stop Switch with guard and 3 Position Run/Stop Selector Switch.

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.

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.

Specifications

Dimensions of control panel ...27”w x 39.75”h x 8.0”d
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
Capacitive Stylus pen
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
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.....2.4 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,

Power Supply - Specification

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

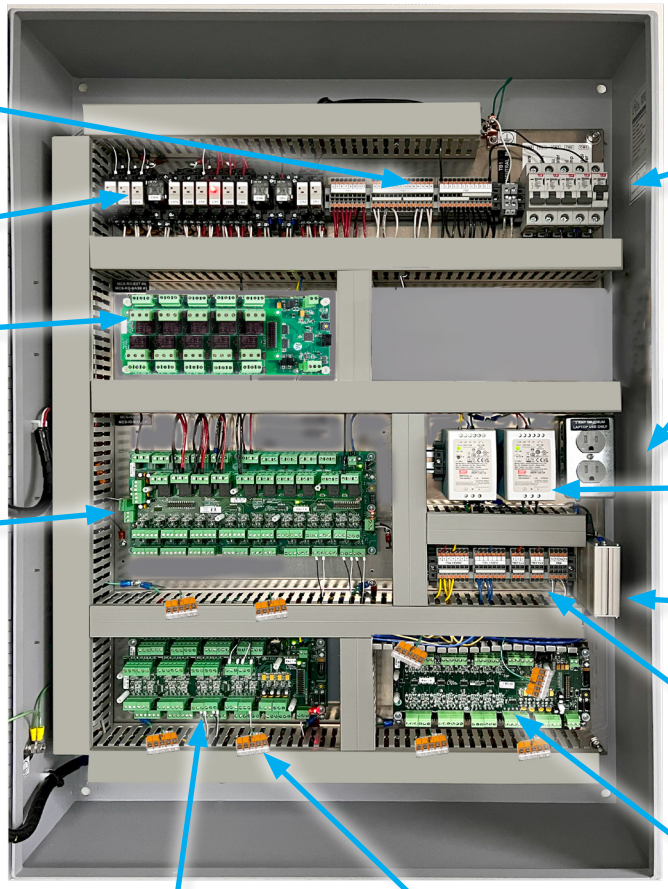
24vdc power supply.....85vac ~ 264vac
AC frequency range.....47 ~ 63Hz / 4A / 96W

MCS-NitroMag-CENTRIFUGAL

INDUSTRIAL CONTROL PANEL

UL 508A - E511647

NEMA Rating Type 2- IP30 Rating



Terminal Blocks to land lines and neutrals for devices

Isolation Relays

MCS-RO-BASE

OPTIONAL
MCS-RO-EXT

MCS-IO-BASE
with MCS-IO-EXT

Separate 16 amp Circuit Breakers for Oil Pump, Oil Heaters and Purge
One control 20 amp Breaker
One 5 amp for outlet

Electrical outlet for Laptop plug-in power at the box

12 vdc & 24 vdc Power Supply

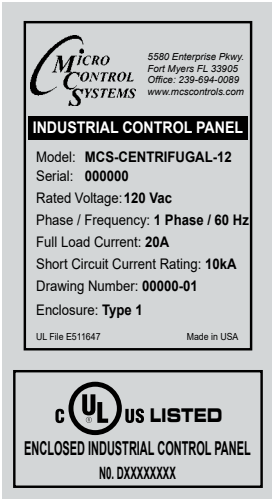
Five port Ethernet Switch

Separate Terminal for BMS

OPTIONAL
MCS-SI-BASE
MCS-SI-EXT

MCS-SI-BASE with MCS-SI-EXT

SHIELDWIRE-GROUNDING multi-terminal connectors (11)



* Optional MCS Expansion and Extension boards shown

UL 508A Certified Industrial Control Panel

Benefits of selecting an Industrial Control Panel that carries the UL 508A certification include:

- UL 508A certification provides the inspection authority and your customer evidence that the control panel complies with nationally recognized safety standards. These standards ensure public safety and provide assurances that the electrical control panel is compliant with national and local electrical codes.
- For a control panel to carry the UL 508A Listing Mark, the panel must contain only UL recognized and listed components. The UL Mark on a component means that UL has evaluated and tested samples of this component and has concluded that they meet the UL requirements. This protects the quality and integrity of the enclosure and provides guarantee of safe performance.

Example Graphics MCS-NitroMag-15.4

15.4 Touchscreen

File No: E169780

WiFi Antenna
Built in WiFi - 2.4 GHz, 5.0 GHz.

Modbus RTU Master programmed in Firmware
Supports up to 10 Modbus devices e.g., VFD's KW Meter, Compressors.

Graphics preloaded

2 HDMI ports
(1 Standard & 1 Micro)

The **MCS-NitroMag-15.4** capacitive touchscreen interface designed to simplify user access with the MCS-Magnum, MCS- NitroMag and MicroMag 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.

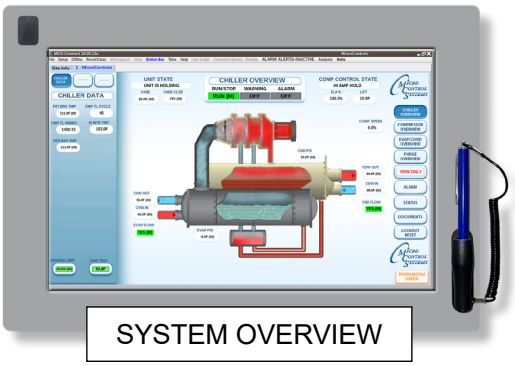
With the new Graphical Interface and MCS-CONNECT, you now have a better view of your controller's many functions as shown on the screens.

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.

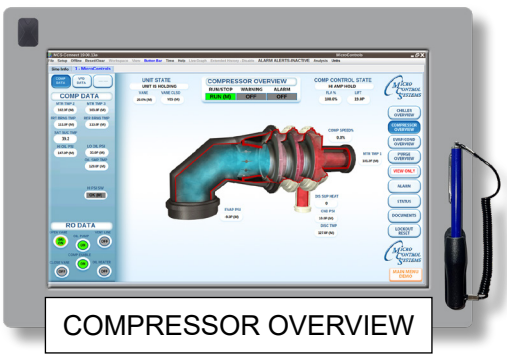
The basic graphics package is pre-installed and can be customized by OEMs with the MCS Graphic Builder or custom built by MCS for your controllers.

Standard screens include:

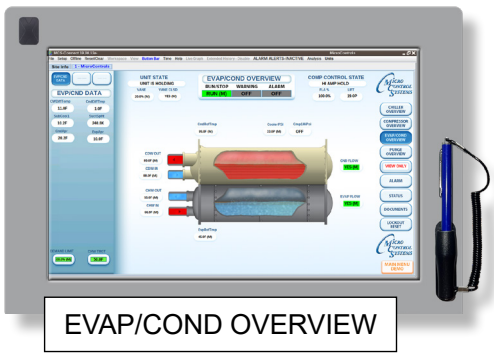
- ***SYSTEM OVERVIEW, COMPRESSOR OVERVIEW, EVAPORATOR/CONDENSER OVERVIEW. PURGE OVERVIEW***



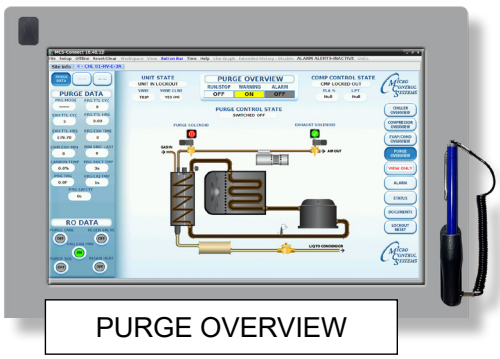
SYSTEM OVERVIEW



COMPRESSOR OVERVIEW



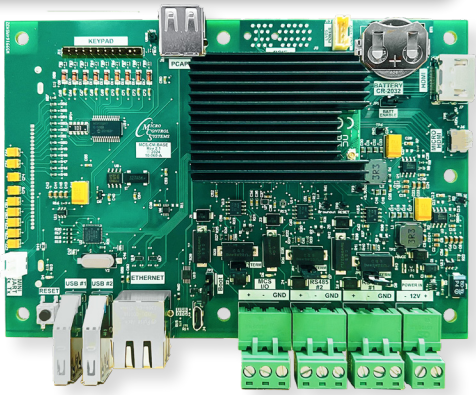
EVAP/COND OVERVIEW



PURGE OVERVIEW

Example Typical Upgrade with Optional Boards

MCS-NitroMag-N



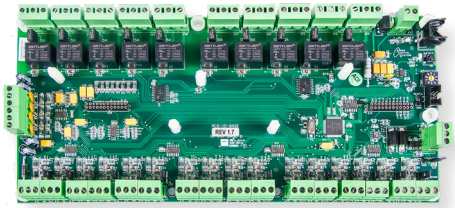
File No: E169780

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.

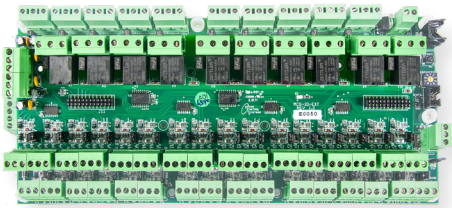
MCS-IO-BASE & MCS-IO-EXT



MCS-IO-BASE has a stand-alone microprocessor which communicates with a MCS-NitroMag, over the MCS-I/O port at 38,400 baud.

All data is check summed with auto error correction. Because communication is over a RS-485 long distance two-wire differential network transmission system, the MCS-IO-BASE may be located up to 5,000 feet away.

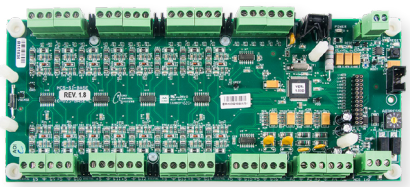
Each MCS-IO-BASE board can be powered by a 12VDC regulated power supply and has a automatic power fail reset system.



The **MCS-IO-EXT** provides a flexible and cost effective way to allow relay output, sensor input and analog output expansion for the MCS-NitroMag.

Each MCS-IO-EXT can be paired with a MCS-IO-BASE to double the number of inputs and outputs. Each MCS-IO-EXT board is powered by the MCS-IO-BASE board once it is stacked on top.

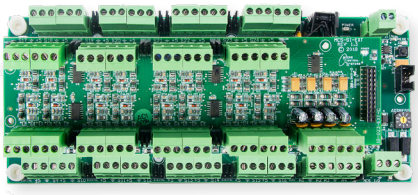
MCS-SI-BASE & MCS-SI-EXT



The **MCS-SI-BASE** provides a flexible and cost effective way to allow sensor input and analog output expansion for the MCS-NitroMag over the MCS-I/O port at 38,400 baud. Each MCS-SI-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 communication is over a RS-485 long distance two-wire differential network transmission system, the MCS-SI-BASE may be located up to 5,000 feet away.

Each MCS-SI-BASE board is powered by a 12VDC regulated power supply and has a automatic power fail reset system.



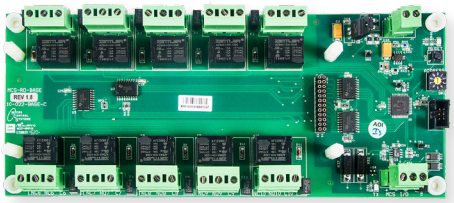
The **MCS-SI-EXT** provides a flexible and cost effective way to allow sensor input and analog output expansion for the MCS-NitroMag,.

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

Each MCS-SI-EXT board is powered by the MCS-SI-BASE board once it is stacked on top.

Example Typical Control Upgrade

MCS-RO-Base & MCS-RO-EXT

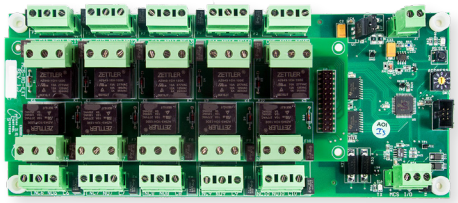


The **MCS-RO-BASE** provides a flexible and cost effective way to allow relay output expansion for the MCS-NitroMag.

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.

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

Each MCS-RO-EXT board is powered by the MCS-RO-BASE board once it is stacked on top.

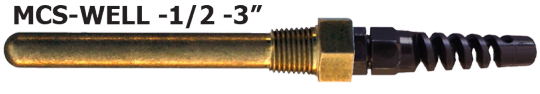
MCS-PRESSURE TRANSDUCERS

The **MCS-150AC** pressure transducer is specially designed for use in low pressure HVAC/refrigeration applications in the most demanding environments. The MCS-150AC pressure transducer uses absolute zero as a definitive reference point, absolute pressure remains precise and accurate regardless of changes in ambient or process temperatures.

The MCS-150AB pressure transducer is CE, UL and RoHs compliant. It is capable of surviving high vibration. MCS-150AC has a cavity built out of stainless steel with a Neoprene sealing material, ¼" SAE Female Flare fitting & Schrader valve; 7/16-20 UNF pipe thread which creates a leak-proof, all metal sealed system that makes the MCS-150AC ideal for use with rugged HVAC environments using refrigerant Media.

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 CVHE-F series chillers in the chilled water and condenser water lines. It comes pre-filled with heat conductive compound to aid in transferring temperature to the sensor.



The **MCS-TUBE** can be epoxied to a discharge or suction line on the CVHE-F 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.

Example Typical Control Upgrade

MCS-T100 Temp Sensor

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 1,000' of cable with no noticeable effect. The MCS-T100 sensor has the ability to move from 32ºF to 212ºF in approximately 10 to 15 seconds.

MCS-EPOXY

- Pre-measured resins and hardeners in one tube
- Easy to use - bonds, seals, plugs, molds and rebuilds
- No special tools needed
- Cures 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 x 105 psi
- Shear Strength ..... 700 psi

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).

MCS-CT500

c UL us
File No: E169780

RoHS Compliant

The 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

Example Typical Control Upgrade

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.alance, over/under voltage, phase loss, reversal, incorrect sequencing and rapid short cycling.

CVHE-F Typical Options

MCS-EXV-DRIVER

The **MCS-EXV-DRIVER** is used for the positioning and control of Sporlan, Alco, Carel, and Danfoss bipolar expansion valves using an analog input of 0-10 VDC (0 VDC = 0% valve opening, 10 VDC = 100% valve opening). The MCS-EXV-DRIVER also supports overdriving on full opened and full closed voltage signals. The display decimal notifies when overdriving by blinking.

Auto Mode – The unit defaults to this mode after every power up. In this mode, the MCS-EXV-DRIVER-XX positions the valve according to the analog input control voltage. **Manual Mode –** When in auto mode, if holding the 'Auto/Manual' key for 5 seconds and then entering the authorization number switches the unit into manual mode.

MCS-SERI

The **MCS-SERI** are Electronically Operated Step motor flow control valves, intended for the precise control of liquid refrigerant flow. Synchronized signals to the motor provide discrete angular movement, which translates into precise linear positioning of the valve piston. Valve pistons and ports are uniquely characterized, providing improved flow resolution and performance.

The MCS-SERI valves are easily interfaced with MCS microprocessor based controllers. Therefore, they are applicable on all the same types of systems found in the air conditioning and refrigeration industry as thermostatic expansion valves.

MCS-ACTUATOR

The **MCS-ACTUATOR** is used in conjunction with MCS controls as a replacement for certain model stepper motor actuators. This MCS Actuator operates as a 'pulse style open/close unit'.

Example Typical Points List with Optional Boards

Relay Outputs (MC-IO-BASE)

#	Output Name	Type	Description
1-1	CompM	Optional	Compressor Start Main
1-2	CompD	Optional	Compressor Start Delta
1-3	OpenVane	Optional	Vane open: relay output used to open the compressor guide vane.
1-4	CloseVane	Optional	Vane closed: relay output used to close the compressor guide vane.
1-5	OilPump	Standard	Oil pump: Turn ON or OFF
1-6	Oil Heater	Standard	Oil Heater: Turn ON or OFF
1-7	HotGasBY	Optional	Hot Gas Bypass: Turn ON or OFF
1-8	Motor Cooling	Optional / CVHA only	Motor Cooling
1-9	PurgExhPmp	Optional	Purge Exhaust Pump
1-10	PurgeEnbl	Optional / User Logic	Purge Enable: this relay will be turned ON when the compressor turns on, allowing the purge to run

Relay Outputs (MC-IO-EXT)

2-1	Purge Sol	Optional	Purge Solenoid
2-2	WarnLight	Standard	Warning Light: unit is in a safety condition prior to a safety shutdown.
2-3	AlarmLight	Standard	Alarm Light: unit is in a safety shutdown
2-4	RunStatus	Standard / User Logic	Hardwired or BMS point to notify BMS that the unit is running
2-5	VentLine	Standard / User Logic	Vent Line: Turn ON or OFF
2-6	Hgby Close	Optional	Floating Hot Gas Bypass: Close
2-7	Hgby Open	Optional	Floating Hot Gas Bypass: Open
2-8	Chw Pump 1	Optional	Chilled Water Pump #1
2-9	Chw Pump 2	Optional	Chilled Water Pump #2
2-10	CndWtrPump	Optional	Condenser Water Pump

Relay Outputs (MC-RO-BASE)

3-1	Cnd Valve	Optional	Condenser Isolation Valve
3-2	Spare	X	Not Used - Reserved for Expansion
3-3	Spare	X	Not Used - Reserved for Expansion
3-4	TwrFan 1	Optional	Tower Fan #1
3-5	TwrFan 2	Optional	Tower Fan #2
3-6	VFD Cabinet Fan	Optional	Cooling Fan for Variable Frequancy Drive Cabinet
3-7	Spare	X	Not Used - Reserved for Expansion

Example Typical Points List with Optional Boards

Relay Outputs (MC-RO-BASE)

#	Output Name	Type	Description
3-8	Spare	X	Not Used - Reserved for Expansion
3-9	Spare	X	Not Used - Reserved for Expansion
3-10	Spare	X	Not Used - Reserved for Expansion

Relay Outputs (User Logic virtual board)

4-1	VentEnbl	Standard / User Logic	Vent Enable - Logic purpose ONLY
4-2	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
4-3	HwBmsR/S	Standard / User Logic	BMS Run/Stop - Logic purpose ONLY
4-4	NtBmsR/S	Standard / User Logic	Virtual Network Point for BMS Run/Stop - Logic purpose ONLY
4-5	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
4-6	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
4-7	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
4-8	d/aHWRst	Standard / User Logic	Disallow Hardwired Reset - Logic purpose ONLY
4-9	d/aNetRst	Standard / User Logic	Disallow Network Reset - Logic purpose ONLY
4-10	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY

Sensor Inputs (MCS-IO-BASE)

#	Input Name	Type	Description
1-1	ChilWtrIn	Standard / MCST100	Chilled Water In Temperature
1-2	ChilWtrOut	Standard / MCST100	Chilled Water Leaving Temperature
1-3	Evap Psi	Standard / MCS-150AC	Evaporator Pressure
1-4	Cnd Psi	Standard / MCS-150AC	Condenser Pressure
1-5	HiOilPsi	Standard / MCS-150AC	High Oil Pressure
1-6	LoOilPsi	Standard / MCS-150AC	Low Oil Pressure
1-7	Suct Temp	Standard / MCS-T100	Suction Temperature
1-8	DiscTmp	Standard / MCS-T100	Discharge Temperature
1-9	OilFeedTmp	Optional/MCS-T100 -CVHA ONLY	Oil Feed Temperature
1-10	OilRetnTmp	Optional/MCS-T100 -CVHA ONLY	Oil Return Temperature
1-11	OilSumpTmp	Standard / MCS-T100	Oil Sump Temperature
1-12	Vane%	Optional / User Defined	Vane Potentiometer
1-13	VaneClosed	Optional / Digital	Vane Closed: relay output used to close the compressor guide vane.
1-14	PhaseLoss	Optional / Digital	Phase Loss: Phase imbalance

Example Typical Points List with Optional Boards

Sensor Inputs (MCS-IO-BASE)

#	Input Name	Type	Description
1-15	Run/Stop	Standard / Digital. Open=Off	Run/Stop Hand Switch
1-16	Emg/Stop	Standard / Digital. Closed=Off	Emergency Stop Switch

Sensor Inputs (MCS-IO-EXT)

2-1	CndRefTmp	Standard / MCS-T100	Condenser Refrigerant Temperature
2-2	EvapRefTmp	Standard / MCS-T100	Evaporator Refrigerant Temperature
2-3	CmpAmpsA	Optional / CT300/500/750	Compressor Amps Phase A
2-4	CmpAmpsB	Optional / CT300/500/750	Compressor Amps Phase B
2-5	CmpAmpsC	Optional / CT300/500/750	Compressor Amps Phase C
2-6	Volts A	Optional / 600VAC4	Volts Phase A
2-7	Volts B	Optional / 600VAC4	Volts Phase B
2-8	Volts C	Optional / 600VAC4	Volts Phase C
2-9	HiPsiSW	Standard / Digital	Mechanical Hi Pressure Safety
2-10	MtrTmp1	Standard / User Defined	Compressor Motor Temperature Leg #1
2-11	MtrTmp2	Standard / User Defined	Compressor Motor Temperature Leg #2
2-12	MtrTmp3	Standard / User Defined	Compressor Motor Temperature Leg #3
2-13	FrtBrngTmp	Standard / MCST100	Front Bearing Temperature
2-14	RerBrngTmp	Standard / MCS-T100	Rear Bearing Temperature
2-15	TransOK	Optional / Digital	Transition Starter OK
2-16	PurgModeSW	Optional / Mode Select Switch	Purge Mode Selector Switch

Sensor Inputs (MCS-SI-BASE)

3-1	PurgSucTmp	Optional / MCS-T100	Purge Suction Temperature
3-2	PurgLiqTmp	Optional / MCS-T100	Purge Liquid Temperature
3-3	PurgSafety	Optional / Digital	Purge Safety
3-4	Spare	X	Not Used - Reserved for Expansion
3-5	VfdCabTemp	Optional / MCS-T100	Vfd Cabinet Temperature
3-6	Ambient	Optional / MCS-T100	Ambient Temperature
3-7	ChlWtrFlow	Optional / Digital	Proof for Chilled Water Flow
3-8	CndWtrFlow	Optional / Digital	Verifies that the condenser water pump is running
3-9	Spare	X	Not Used - Reserved for Expansion
3-10	CndWtrIn	Standard / MCS-T100	Condenser Water In Temperature

Example Typical Points List with Optional Boards

Sensor Inputs (MCS-SI-BASE)

#	Input Name	Type	Description
3-11	CndWtrOut	Standard / MCS-T100	Condenser Water Leaving Temperature
3-12	Spare	X	Not Used - Reserved for Expansion
3-13	HwBmsDmd	Demand %	Hardwired Point for Demand %
3-14	HwBmsChwr	TRGTRST	Hardwired BMS Chilled Water Reset: Reset target temperature
3-15	Spare	X	Not Used - Reserved for Expansion
3-16	Spare	X	Not Used - Reserved for Expansion

Sensor Inputs (MCS-SI-EXT)

4-1	Vfd Fault	Optional / Digital or Modbus	Vfd Fault
4-2	Vfd Hertz	Optional / User Defined or Modbus	Vfd Hertz
4-3	Vfd Kw	Optional / Kw or Modbus	Vfd Kilowatts
4-4	ChlWtrPmpFlt	Optional / Digital	Chilled Water Pump Fault
4-5	CndWtrPmpFlt	Optional / Digital	Condenser Water Pump Fault
4-6	Spare	X	Not Used - Reserved for Expansion
4-7	Spare	X	Not Used - Reserved for Expansion
4-8	Spare	X	Not Used - Reserved for Expansion
4-9	Spare	X	Not Used - Reserved for Expansion
4-10	Unit Amps	Standard / User Logic	Unit Amps
4-11	HiOilTmp	Standard / User Logic	High Oil Tempurature
4-12	UnitInL/O	Standard / User Logic	Tests for Unit in Lock Out
4-13	CtlRun/Stop	Standard / User Logic	Control Run/Stop
4-14	Spare	X	Not Used - Reserved for Expansion
4-15	Spare	X	Not Used - Reserved for Expansion
4-16	Spare	X	Not Used - Reserved for Expansion

Sensor Inputs - (User Logic virtual board)

5-1	ChwFlow	Standard / User Logic	Chilled Water Flow
5-2	CdwFlow	Standard / User Logic	Condenser Water Flow
5-3	ChwGPM	Standard / User Logic	Chilled Water Gallons Per Minute
5-4	CdwGPM	Standard / User Logic	Condenser Water Gallons Per Minute
5-5	NetBmsRun	Standard / BMS-SI	Hardwired BMS RUN/STOP
5-6	NetBmsDmd	Standard / BMS-SI	Hardwired Point for Demand %

Example Typical Points List with Optional Boards

Sensor Inputs - (User Logic virtual board)

#	Input Name	Type	Description
5-7	NetBmsChwr	Standard / BMS-SI	Hardwired BMS chilled water reset: Reset target temperature
5-8	Fla%	Standard / User Logic	Full Load Amp % Calculation
5-9	Lift	Standard / User Logic	Lift Calculation
5-10	ChwAppr	Standard / User Logic	Condenser Water Approach: difference between saturated discharge temperature minus the condenser leaving water
5-11	ChwDiffTmp	Standard / User Logic	Condenser Differential Temperature: difference between leaving/entering temperature
5-12	CdwAppr	Standard / User Logic	Condenser Water Approach: difference between saturated discharge temperature minus the condenser leaving water
5-13	CdwDiffTmp	Standard / User Logic	Condenser Differential Temperature: difference between leaving/entering temperature
5-14	DisTpSrgOv	Standard / User Logic	Discharge Temperature Surge Override
5-15	Subcooling	Standard / User Logic	Subcooling Calculation
5-16	SuctSuperH	Standard / User Logic	Suction Super Heat

Sensor Inputs - (User Logic virtual board)

6-1	HiBrngTmp	Standard / User Logic	Hi Bearing Temperature - Logic purpose ONLY
6-2	MtrTmp1&2	Standard / User Logic	Motor Temperature Compressors 1&2 - Logic purpose ONLY
6-3	HiMtrTmp	Standard / User Logic	Hi Motor Temperature - Logic purpose ONLY
6-4	UnitTons	Standard / TONS	Unit Tons - Logic purpose ONLY
6-5	UnitKW	Standard / KW	Unit Kilowatts - Logic purpose ONLY
6-6	Kw/Tons	Standard / User Logic	Unit Kilowatts/Tons Calculation - Logic purpose ONLY
6-7	PwrFactor	Standard / User Logic	Power Factor Calculation - Logic purpose ONLY
6-8	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
6-9	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
6-10	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
6-11	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
6-12	Ctl Flow	Standard / User Logic	Control Flow - Tests both Condenser and Chilled Water Flow - Logic purpose ONLY
6-13	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
6-14	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
6-15	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
6-16	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY

Example Typical Points List with Optional Boards

Sensor Inputs - (User Logic virtual board)

#	Input Name	Type	Description
7-1	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
7-2	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
7-3	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
7-4	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
7-5	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
7-6	HwBmsDmd	Standard / User Logic	Hardwired Point for Demand % - Logic purpose ONLY
7-7	HwBmsRset	Standard / User Logic	Hardwired Point for Target Reset - Logic purpose ONLY
7-8	NtBmsDmd	Standard / User Logic	Virtual Network Point for Demand % - Logic purpose ONLY
7-9	NtBmsRset	Standard / User Logic	Virtual Network Point for Target Reset - Logic purpose ONLY
7-10	Bms R/S	Standard / User Logic	Virtual Network Point for Run/Stop - Logic purpose ONLY
6-11	BmsDemand	Standard / User Logic	Virtual Network Point for Demand % - Logic purpose ONLY
7-12	BmsReset	Standard / User Logic	Virtual Network Point for Target Reset - Logic purpose ONLY
7-13	d/aHwRst	Standard / User Logic	Disable Hardwired Reset - Logic purpose ONLY
7-14	d/aNetRst	Standard / User Logic	Disable Network Reset - Logic purpose ONLY
7-15	Spare	X	Not Used - Reserved for Expansion - Logic purpose ONLY
7-16	Allow Unit	Standard / User Logic	Run/stop indicator for graphic display - Logic purpose ONLY

Analog Outputs (MCS-IO-BASE)

#	Input Name	Type	Description
1-1	Comp Spd%	Optional	Compressor Speed%
1-2	CndWtrValve%	Optional	Condenser Water Valve%
1-3	CndFanSpd%	Optional	Condenser Fan Speed%
1-4	CndPmpSpd%	Optional	Condenser Pump Speed%

Analog Outputs (MCS-IO-EXT)

2-1	ChlWtrSpd%	Optional	Chilled Water Pump Speed%
2-2	CndWtrSpd%	Optional	Condenser Water Pump Speed%
2-3	Spare	X	Not Used - Reserved for Expansion
2-4	Spare	X	Not Used - Reserved for Expansion

Analog Outputs (MCS-SI-BASE)

3-1	Spare	X	Not Used - Reserved for Expansion
3-2	Spare	X	Not Used - Reserved for Expansion
3-3	Spare	X	Not Used - Reserved for Expansion
3-4	Spare	X	Not Used - Reserved for Expansion

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 Starter 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 over 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 wires?_____
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 Temperature? ☐ Yes ☐ No

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

Click for Brochure Upgrades▶

1. ***Viewing form printed Brochure***, Scan QR code from mobile device, email the form to your email address.
2. Click on the emailed link. Fill out the digital fillable form on a computer and email to sales@mcscontrols.com
3. ***Viewing brochure from Computer,*** click on QR code, find the form your need, click on fillable form, fill out and email to sales@mcscontrols.com

MICRO CONTROL SYSTEMS

5580 Enterprise Pkwy., Fort Myers, FL 33905
Office: 239-694-0089 • Fax: 239-694-0031
www.mcscontrols.com