![Micro Control Systems logo]

MCS Total Solutions for all your HVAC/R Control Needs

MCS-CENTRIFUGAL-12
Industrial Control Panel

c(UL)us
UL 508

YK CONTROLS-12 UPGRADE
with Optional VFD Control

This brochure describes a standard upgrade package for the YK® 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 brief questionnaire in the back of this brochure and forward to your sales representative for an estimate.

MCS CENTRIFUGAL-12
Industrial Control Panel

NEMA rating - Type 1

Dimensions - 27"w x 39.75"h x 8.0"d

Certification - UL508A

MCS-MAGNUM-N-12
Controller Specification

Microprocessor	Zilog eZ80 Acclaim! @ 50mhz
Sensor Inputs (SI)	12 inputs 0-5vdc (10-bit A/D)
Digital Inputs	4 inputs 0 or 5vdc only
Relay Outputs (RO)	10 outputs 6.3amps @ 230vac
Analog Outputs (AO)	4 outputs 0-10vdc
Printed Circuit Board	Six layer with separate power and ground planes
Input Power (Standard)	12vdc-90W
MCS-I/O Comm Port	1 @ 38,400 baud
RS-485 Comm Port	1 @ 19,200 baud
Ethernet	10/100 Mbps Ethernet
Real Time Clock	Battery backup
Power Detection	Automatic power fail reset

Touch Screen 15.4

Dimensions	12.11"W x 17"L X 3.228"H
LCD Screen	15.4" (16:10 Diagonal), 16.2 Million Colors, 1280x800 Resolution

The **MCS-CENTRIFUGAL-12** comes standard equipped with an MCS-MAGNUM-N -12 controller board, 15.4" Touch Screen, three 16 amp, one 20 amp and one 5 amp circuit breakers. There is also an electrical outlet for laptop plug-in power at the panel.

The Enclosure has the following expansion boards installed:

One (1) MCS-SI-Base, One (1) MCS-SI-BASE with MCS-SI-EXT, and ONE (1) MCS-RO-Base with MCS-RO-EXT.

With the expansion boards you have a total of:

- 60 Sensor Inputs
- 30 Relay Outputs
- 16 Analog Outputs

Standard configuration includes: Isolation relays, BMS Network connectivity, (Field selectable hardware or network BMS), and BMS terminal block for chiller relay.
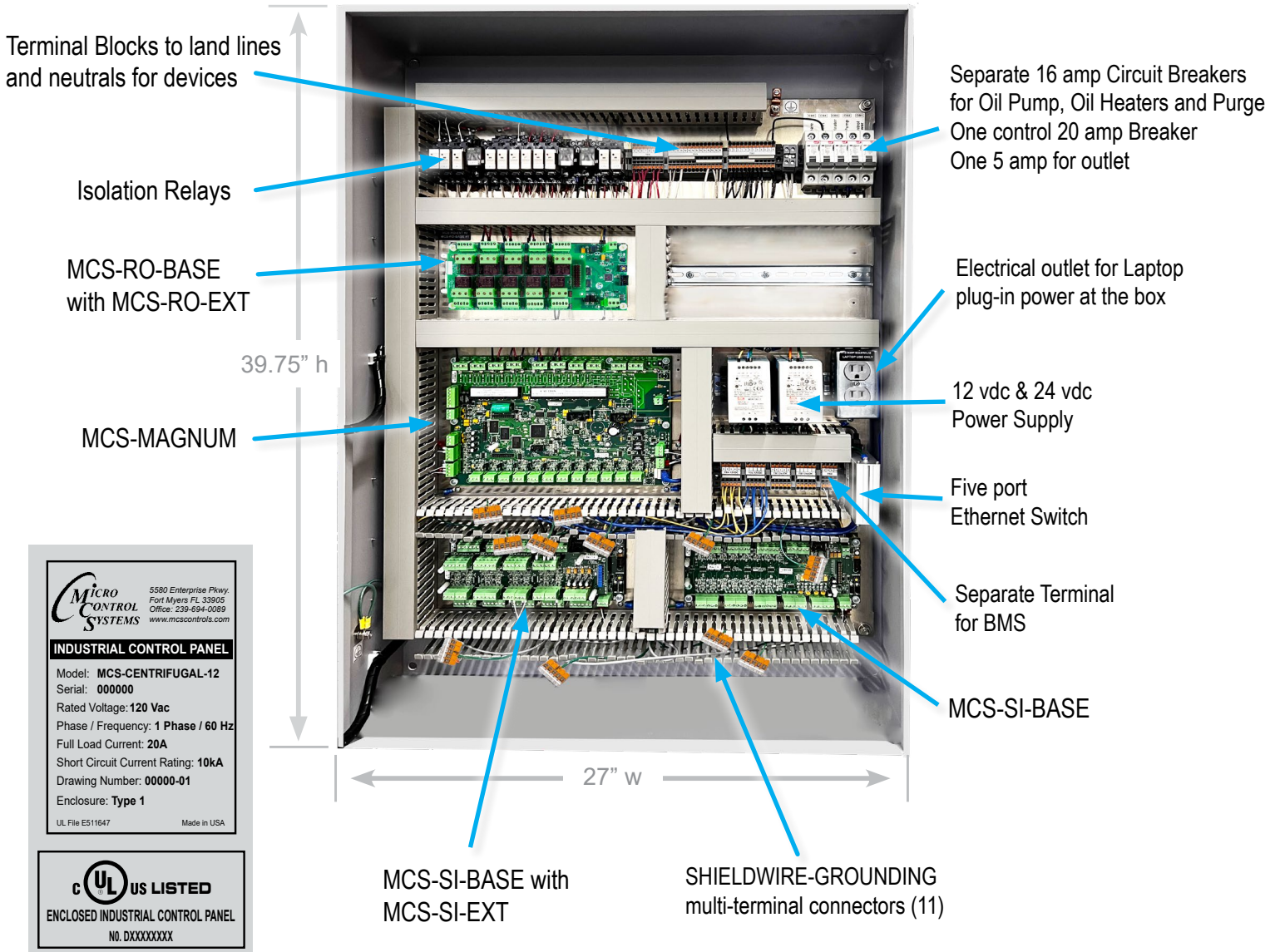
The following warning lights and switches are included in the standard enclosure; Alarm, Warning, Emergency SW, Hand/Off/ Auto Switch.

This panel is intended for use in an environment protected from the weather.

YK Chiller showing old controls

YK Chiller after upgrading to MCS-MAGNUM 15.4 Controls

c(UL)us

UL 508A - E511647

NEMA Rating Type 1- P20 Rating

Terminal Blocks to land lines and neutrals for devices

Isolation Relays

MCS-RO-BASE with MCS-RO-EXT

39.75" h

MCS-MAGNUM

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

MCS-SI-BASE

27" w

MCS-SI-BASE with MCS-SI-EXT

SHIELDWIRE-GROUNDING multi-terminal connectors (11)

Micro Control Systems
5580 Enterprise Pkwy.
Fort Myers FL 33905
Office: 239-694-0089
www.mcscontrols.com

INDUSTRIAL CONTROL PANEL
Model: MCS-CENTRIFUGAL-12
Serial: 000000
Rated Voltage: 120 Vac
Phase / Frequency: 1 Phase / 60 Hz
Full Load Current: 20A
Short Circuit Current Rating: 10kA
Drawing Number: 00000-01
Enclosure: Type 1
UL File E511647   Made in USA

c (UL) us LISTED
**ENCLOSED INDUSTRIAL CONTROL PANEL**
NO. DXXXXXXXX

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.

YK Control Enclosure Upgrade

MCS-MAGNUM-N-12
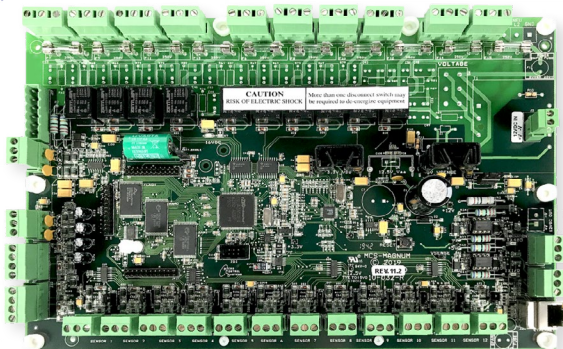
The **MCS-MAGNUM-N-12** is a durable microprocessor based controller designed for the hostile environments in the HVAC/R industry. It is designed to be the primary manager of the package it is controlling.

The Magnum provides flexibility with set points and control options that can be selected prior to commissioning a system or when the unit is live and functioning. The TouchScreen and MCS-CONNECT provide a clear and simple language that informs the user as to the status of the controller.

15.4 Touchscreen

The **MCS-TOUCH-15.4** capacitive touchscreen interface designed to simplify user access with the MCS-Magnum and MicroMag utilizing MCS-Connect to provide both graphics and service mode access to technicians. Input method: Finger, , Stylus and *Glove.

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-TOUCH-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.
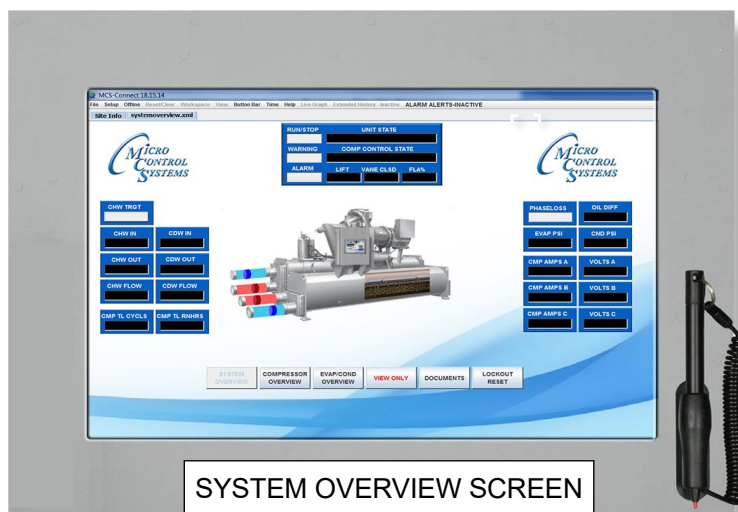
SYSTEM OVERVIEW SCREEN

- Freescale i.MX6 Dual Core 800mhz Motherboard
- ARM 9 32-bit RISC ARM processor
- 1Gb of 512mhz DDR3 RAM memory
- 4Gb of eMMC Flash memory
- 10m/100m/1G Ethernet

- 1 Micro-SD Slots
- 1 USB On-The-Go
- 2 USB Host 2.0
- Real Time Clock w/ Battery
- 3 RS485 communication ports

YK Control Enclosure Upgrade

Graphics For Touchscreens

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.

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

Standard screens include:

- System Oveview Screen
- Compressor Overview Screen
- Evaporator/Condenser Overview Screen
- Documents

Additional screens can be added depending on the custom configuration of your system.

Documents, Spec Sheets, Drawings, etc.

Stored in the Touchscreen's flash memory you will find pdf's and documents pertaining to the building of your unit. Each unit's configuration is different, so the 'SITE DOCUMENTS' file will pertain to that unit only and stored at the site.
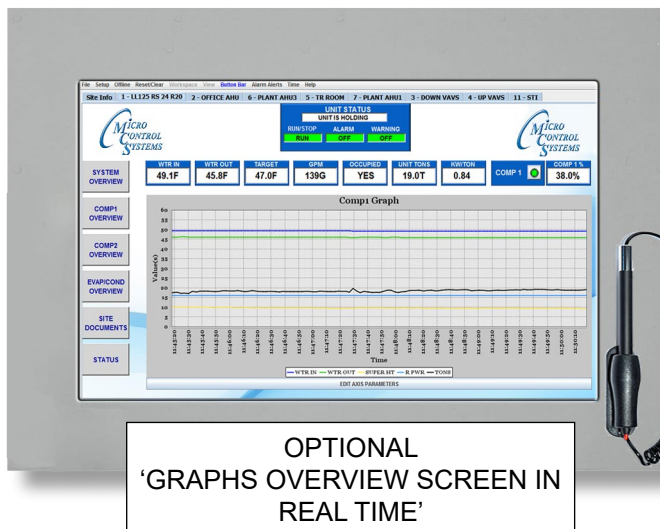
1. DRAWINGS (PDF'S) of the components used in this unit
2. MANUALS (if installed in your unit)

    a. Getting Started Manual

    b. Keypad Manual

    c. Touchscreen Manual

    d. MCS-CONNECT Manual

    e. EXV Manual

    f. BMS-GATEWAY Startup Guide
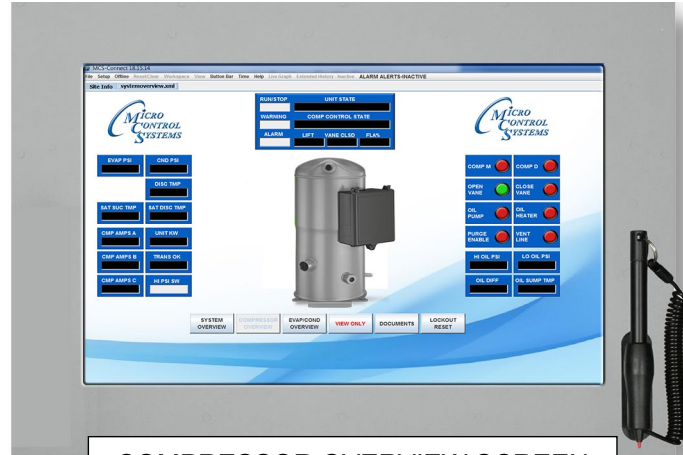
COMPRESSOR OVERVIEW SCREEN
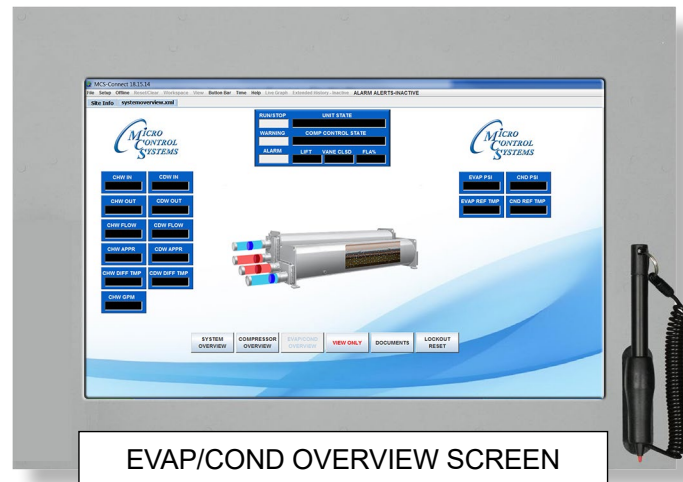

EVAP/COND OVERVIEW SCREEN

OPTIONAL
'GRAPHS OVERVIEW SCREEN IN REAL TIME'

YK Control Enclosure Upgrade

MCS-SI-BASE

The **MCS-SI-BASE** provides a flexible and cost effective way to allow sensor input and analog output expansion for the **MCS MAGNUM**. Each MCS-SI-BASE has a stand-alone microprocessor which communicates with the MCS MAGNUM 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.
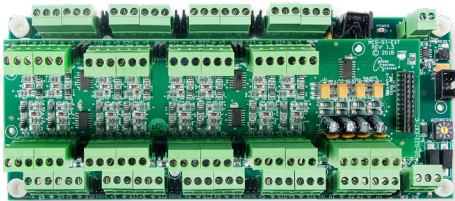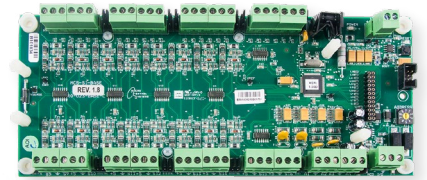
MCS-SI-EXT mounted to
MCS-SI-BASE

MCS-SI-EXT

The **MCS-SI-EXT** provides a flexible and cost effective way to allow sensor input and analog output expansion for the **MCS MAGNUM**.
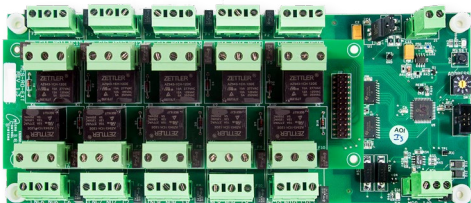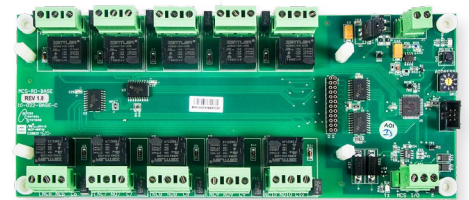Each MCS-SI-EXT can be paired with a MCS-SI-BASE to double the number of inputs and outputs. Each
MCS-SI-EXT board is powered by the MCS-SI-BASE board once it is stacked on top.

MCS-RO-BASE

The **MCS-RO-BASE** provides a flexible and cost effective way to allow relay output expansion for the **MCS-MAGNUM**. Each MCS-RO-BASE has a stand-alone micropro-cessor which communicates with a Magnum/Micromag 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.

MCS-RO-EXT

MCS-RO-EXT mounted to
MCS-RO-BASE

The **MCS-RO-EXT** provides a flexible and cost effective way to allow relay output expansion for the **MCS MAGNUM**.
Each MCS-RO-EXT can be paired with a MCS-RO-BASE to double the number of out-puts.
Each MCS-RO-EXT board is powered by the MCS-RO-BASE board once it is stacked on top.

YK Control Enclosure Upgrade

MCS-T-100 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 1000' 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-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 PEH-WSC chillers in the chilled water and condenser water lines. It comes pre-filled with heat conductive compound to aid in temperature to the sensor.

1/2 - 3"

1/4- 2.5"
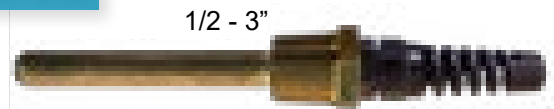
The **MCS-TUBE** can be epoxied to a discharge or suction line on the PEH-WSC chillers in order to obtain temperature readings without the use of a well. It was designed to be used with the MCS-T100 temperature sensor and comes pre-filled with heat conductive compound to aid in transferring temperature to the sensor.

MCS-PHASE

The **MCS-PHASE** is a programmable 3-phase line voltage monitor with 25-fault memory, high temperature LCD display, easy setup and clear diagnostic readout of system faults. The MCS-PHASE 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.

At power up, the MCS-PHASE evaluates the incoming power for proper phase sequence, amplitude and voltage unbalance. If the three phase input at the line side connections is within user-set parameters, the load energize LED is turned on and the internal relay is energized. Continuity will be across terminals 4 and 6. If connections are made to the load side terminals, the MCS-PHASE will transfer monitoring over to the load side only.

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 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 transducers ideal for use with rugged HVAC environments.

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

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.

This sensor allows the **MCS-Magnum** to safely protect the motors on the unit from under voltage, over voltage and voltage imbalance conditions. It also can be used to calculate unit KW (requires amp and power factor sensors).
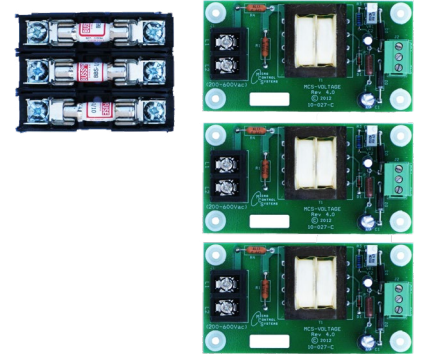
MCS-USB-RS485

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

When the MCS-USB-RS485 cable is plugged into a laptop or PC, Windows will install a device driver that allows the cable to be used as a standard Window communication port.

YK® Typical Options

BMS GATEWAY

The **MCS-BMS-GATEWAY** is a microprocessor based communication device that provides translation from Bacnet IP, Bacnet MSTP, Modbus IP, Lontalk, or Johnson N2 communication interface. Information that can be transmitted includes the status of control points, alarm information, digital inputs, analog inputs or setpoints.

The MCS-BMS-GATEWAY protocol is field selectable by setting jumper on the device. Using **MCS-CONFIG** and the CONFIG files for the MCS-MAGNUM, you can automatically create the CSV files that is required by the MCS-BMS-GATEWAY.
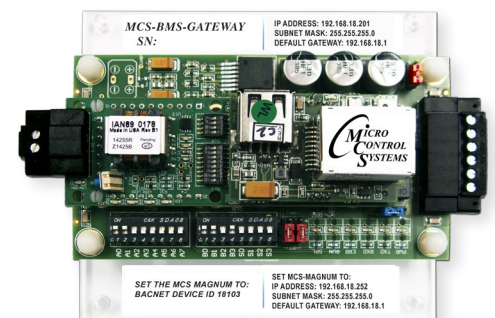
YK Typical Point List

Relay Outputs

#	Output Name	Type	Description
M-1	Comp Enbl	Standard	Compressor Enable - Turns Compressor On
M-2	Spare	X	Not Used - Reserved for Expansion
M-3	Open Vane	Standard	Vane Open: Relay output used to open the compressor guide vane.
M-4	Close Vane	Standard	Vane Closed: Relay output used to close the compressor guide vane.
M-5	Oil Pump	Standard	Oil Pump: Turn ON or OFF
M-6	Oil Heater	Standard	Oil Heater: Turn ON or OFF
M-7	Spare	X	Not Used - Reserved for Expansion
M-8	Spare	X	Not Used - Reserved for Expansion
M-9	Spare	X	Not Used - Reserved for Expansion
M-10	PurgEnabl	User Logic	Purge enable: this relay will be turned ON when the compressor turns on allowing the purge to run
1-1	Spare	X	Not Used - Reserved for Expansion
1-2	WarnLight	Standard	Warning Light: unit is in a safety condition prior to a Safety Shutdown.
1-3	AlarmLight	Standard	Alarm Light: Unit is in a Safety Shutdown
1-4	RunStatus	User Logic	Hardwired or BMS point to notify BMS that the unit is running
1-5	VentLine	User Logic	Vent line: Turn ON or OFF
1-6	Spare	X	Not Used - Reserved for Expansion
1-7	Spare	X	Not Used - Reserved for Expansion
1-8	ChilWtrPmp	Standard	Chilled Water Pump: Turn ON or OFF
1-9	Spare	X	Not Used - Reserved for Expansion
1-10	CndWtrPump	User Logic	Condenser Pump: Turn ON or OFF
2-1 thru 2-10	Spare	X	Not Used - Reserved for Expansion
3-1	Spare	X	Not Used - Reserved for Expansion
3-2	Spare	X	Not Used - Reserved for Expansion
3-3	HwBMS R/S	User Logic	Hardwired BMS Run/Stop
3-4	NtBMS R/S	User Logic	Virtual Network Point for Run/Stop
3-5	Spare	X	Not Used - Reserved for Expansion
3-6	Spare	X	Not Used - Reserved for Expansion
3-7	Spare	X	Not Used - Reserved for Expansion

YK Typical Point List

Relay Outputs (continued)

#	Output Name	Type	Description
3-8	DisHwRst	User Logic	Disallow Hardwired Reset
3-9	DisNetRst	User Logic	Disallow Network Reset
3-10	Spare	X	Not Used - Reserved for Expansion

Analog Outputs

#	Output Name	Type	Description
M-1	Comp Speed%	Analog Output	Speed signal to compressor
M-2	Spare	X	Not Used - Reserved for Expansion
M-3	Tower Fan%	Analog Output	Percentage to drive the tower fan
M-4	Spare	X	Not Used - Reserved for Expansion

Sensor Inputs

#			
M-1	ChilWtr In	MCST100	Chilled Water In Temperature
M-2	ChilWtrOut	MCST100	Chilled Water Out Temperature
M-3	Evap Psi	MCS-200	Evaporator Pressure
M-4	Cnd Psi	MCS-500	Condenser Pressure
M-5	Hi Oil Psi	MCS-500	Hi Oil Pressure
M-6	Lo Oil Psi	MCS-500	Lo Oil Pressure
M-7	Spare	X	Not Used - Reserved for Expansion
M-8	Disc Tmp	MCST100	Discharge Temperature
M-9	Spare	X	Not Used - Reserved for Expansion
M-10	Spare	X	Not Used - Reserved for Expansion
M-11	OilSumpTmp	MCST100	Oil Sump Temperature
M-12	Spare	X	Not Used - Reserved for Expansion
M-13	Vane Closed	Digital	Vane Closed: relay output used to close the compressor guide vane.
M-14	PhaseLoss	Digital	Phase Loss: Phase Imbalance
M-15	Run/Stop	Digital	Run/Stop Hand Switch
M-16	Emg/Stop	Digital	Emergency Stop Switch

YK Typical Point List

Sensor Inputs

#	Input Name	Type	Description
1-1	CndRefTmp	MCST100	Condenser Refrigerant Temperature
1-2	EvpRefTmp	MCST100	Evaporator Refrigerant Temperature
1-3	CmpAmpsA	CT-750	Reads Amp Draw on Leg 1
1-4	CmpAmpsB	CT-750	Reads Amp Draw on Leg 2
1-5	CmpAmpsC	CT-750	Reads Amp Draw on Leg 3
1-6	UnitVolts	User Logic	Unit Volts
1-7	Spare	X	Not Used - Reserved for Expansion
1-8	Spare	X	Not Used - Reserved for Expansion
1-9	HiPsiSW	Digital	Mechanical Hi Pressure Safety
1.10-14	Spare	X	Not Used - Reserved for Expansion
1-15	StartFault	Digital	Starter Fault
1-16	Spare	X	Not Used - Reserved for Expansion
2.1-3	Spare	X	Not Used - Reserved for Expansion
2-4	PrgFlotBot	Digital	Purge Float Bottom. Oil level in Purge Canister.
2-5	PrgFlotTop	Digital	Purge Float Top. Oil level in Purge Canister.
2-6	Purge PSI	TI-150A	Purge Pressure. Pressure in Canister
2-7	ChlWtrFlow	Digital	Proof for Chilled Water Flow
2-8	CndWtrFlow	Digital	Verifies that Condenser Pump is running
2-9	Spare	X	Not Used - Reserved for Expansion
2-10	CndWtrIn	MCST100	Condenser Water Incoming Temperature
2-11	CndWtrOut	MCST100	Condenser Water Leaving Temperature
2-12	Spare	X	Not Used - Reserved for Expansion
2-13	HwBmsDmd	DEMAND%	Hardwired Point for Demand %
2-14	HwBmsChwr	TRGTRST	Hardwired BMS Chilled Water Reset: Reset Target Temperature
2.15-16	Spare	X	Not Used - Reserved for Expansion
3-1	VfdFault	Digital	VFD Alarm
3-2	VfdHertz	User Defined	Hardwired or through modbus
3-3	VfdKW	User Defined	Hardwired or through modbus
3-4	VfdVolts	User Defined	Hardwired or through modbus

Sensor Inputs (continued)

#	Input Name	Type	Description
3.5-11	Spare	X	Not Used - Reserved for Expansion
3-12	UnitInL/O	User Logic	Tests for Unit in Lock Out
3-13	CtlRun/Stop	User Logic	Control Run/Stop
3.14-16	Spare	X	Not Used - Reserved for Expansion
4.1-3	Spare	X	Not Used - Reserved for Expansion
4-4	ChwGPM	User Logic	Chilled Water Gallons per Minute
4-5	NetBmsRun	BMS_SI	Virtual Network Point for Run/Stop
4-6	NetBmsDmd	BMS_SI	Virtual Network Point for Demand %
4-7	NetBmsChwr	BMS_SI	Virtual Network Point for Chilled Water Reset: Reset Target Temp
4-8	Fla%	User Logic	Full Load Amp % Calculation
4-9	Lift	User Logic	Lift Calculation
4-10	ChwAppr	User Logic	Chilled Water Approach: Difference between refrigerant temperature/leaving water temperature
4-11	ChwDiffTmp	User Logic	Chilled Water Temperature Differential: Difference between entering/leaving temperature
4-12	CdwAppr	User Logic	Chilled Water Approach: Difference between refrigerant temperature/leaving water temperature
4-13	CdwDiffTmp	User Logic	Condenser Differential Temperature: Difference between leaving/entering temperature
4-14	Spare	X	Not Used - Reserved for Expansion
4-15	Subcooling	User Logic	Subcooling Calculation
4-16	Spare	X	Not Used - Reserved for Expansion
5.1-3	Spare	X	Not Used - Reserved for Expansion
5-4	Unit Tons	TONS	Unit Tons
5-5	Unit KW	KW	Unit KW
5-6	KW/Tons	User Logic	Unit KW/Ton Calculation
5-7	PwrFactor	User Logic	Power Factor Calculation
5.8-11	Spare	X	Not Used - Reserved for Expansion
5-12	CtlFlow	User Logic	Control Flow - Tests both Condenser and Chilled Water Flow
5.13-16	Spare	X	Not Used - Reserved for Expansion

Sensor Inputs (continued)

#	Input Name	Type	Description
6.1-5	Spare	X	Not Used - Reserved for Expansion
6-6	HwBmsDMD	User Logic	Hardwired Point for Demand %
6-7	HwBmsReset	User Logic	Hardwired Point for Target Reset
6-8	NetBmsDMD	User Logic	Virtual Network Point for Demand %
6-9	NetBmsReset	User Logic	Virtual Network Point for Target Reset
6-10	BMS R/S	User Logic	Virtual Network Point for Run/Stop
6-11	BMS DMD	User Logic	Virtual Network Point for Demand %
6-12	BMS Reset	User Logic	Virtual Network Point for Target Reset
6-13	d/aHwRst	User Logic	Disallow Hardwired Reset
6-14	d/aNetRst	User Logic	Disallow Network Reset
6-15	Spare	X	Not Used - Reserved for Expansion
6-16	Spare	X	Not Used - Reserved for Expansion

YK Information

Please visit our website for a fillable form that you can email to: sales@mcscontrols.com

Company: _____   Phone: _____

Name: _____Title:_____   Email: _____

Mobile:_____   Site: _____

Model Number	Serial Number	Refrigerant Used	Full Load Amps of Compressor

1. *Model of existing Panel:*
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?:* What is the VFD Make and Model?   Make: Model:
   a. Will the VFD be hardwired to MCS controls, over MODBUS or both?
   b. If you are using a VFD other than a Yaskawa VFD, do you need MCS to control the VFD Enclosure Temperature and Fans?   Yes   No
4. *What protocol will be used for Building Management communication?*
5. *For the Vane Actuator, is there a Digital Switch or a Potentiometer?*
6. *If there is a Potentiometer, what is the Actuator Model?*   Model:
7. *Will Phase loss need to be monitored?*   Yes   No   *How would you like the pressures to be displayed?*
8. *What kind of Hot Gas Bypass is present?*
9. *Is MCS controlling the Chilled Water Pump(s)?*   Yes   No   *How will they be wired?*
10. *How will the Condenser Water Pump be wired or will a Condenser Isolation Valve be used?*
11. *Are there Tower Fan(s)*   Yes   No   *Is MCS controlling these fan(s)? How many are there, how are they wired?*
12. *What Main Voltage is being supplied to the unit?*   Voltage:_____   Is MCS monitoring Main Voltage?   Yes   No
13. *What is the Control Voltage being supplied?*   Voltage:_____
14. *What is the 'RUN LOAD AMPS' (FLA)*   COMP 1:   COMP 2:
15. *Will the Chilled/Condenser Water Flow be measured by Flow or Differential?*
16. *Does / Will unit have a refrigerant Level Sensor*   Yes   No

    If no, MCS will control on Suction Superheat.

    If yes, is the Level Sensor located on: *Evaporator*   *Condenser*

    Level Sensor Model:_____   Signal Output?_____
17. *Is there a refrigerant flow control valve operated by an actuator?*   Yes   No

    If yes, is the actuator controlled on a 0-10 vdc ___ , 4-20 ma___, other____?

    If other, the actuator will need to be changed. Belimo AMB24-MFT is one option.
18. *Is there a VFD on the oil pump?*   Yes   No   If Yes, what the Rated Load Amps on the oil pump?_____
19. *Is there a moveable diffuser wall on the compressor?*   Yes   No

COMMENTS (is there any other information we should know?):

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