

SWITCHBOARD INSTRUMENT SELECTOR GUIDE

Model Type	MCS
Case Style	4 1/4" Metal
Available	
Input Rating	
AC Milliamperes	X
AC Amperes	X
AC Voltage	X
DC Microamperes	X
DC Milliamperes	X
DC Amperes	X
DC Millivolts	X
DC Voltage	X
Frequency	X
AC Watts	X
AC VARS	X
Power Factor	X
AC Synchroscope	X
RPM Indicator	X
Process Indicator	X



MCS Switchboard specifications in accordance with ANSI C39.1

Accuracy: $\pm 1.0\%$ of full scale basic accuracy class.

Specific accuracies:

Expanded Scale Voltmeter - 0.3% of mid-scale.

Power factor meter - $\pm 1\%$ of fiducial value from 40-120% of rated current.

Synchroscope - $\pm 1\%$ of scale length.

Frequency meters - $\pm .15\text{Hz}$ @45-55Hz and 55-65Hz, $\pm 0.08\text{Hz}$ 58-62Hz,

$\pm 1.3\text{Hz}$ @350-450Hz.

Position of use: Vertical (scale)

Full scale deflection angle: 250° , except synchroscope is 360°

Full scale length: MCS - 6.9 inches.

Scale plate: MCS platform type 2 piece scale with graduations on the outer scale; numerals and legends on the inner scale.

Case: All MCS switchboard instruments have drawn steel case with matt black powder coating.

Cover: Front cover has bezel & window made by one piece of flame retardant Polycarbonate molding with black matte finished bezel area.

Mounting studs: 1/4" x 28 thread.

Terminal studs: 10-32 thread.

Operating temperature range: 0 to 40°C (32 to 104°F).

Storage temperature range: -10 to 50°C (14 to 122°F).

Extreme temperature range: -20°C to 65°C (-4 to 149°F).

Dielectric level: 2300VAC for 1 minute between the electrical circuit and mounting studs.

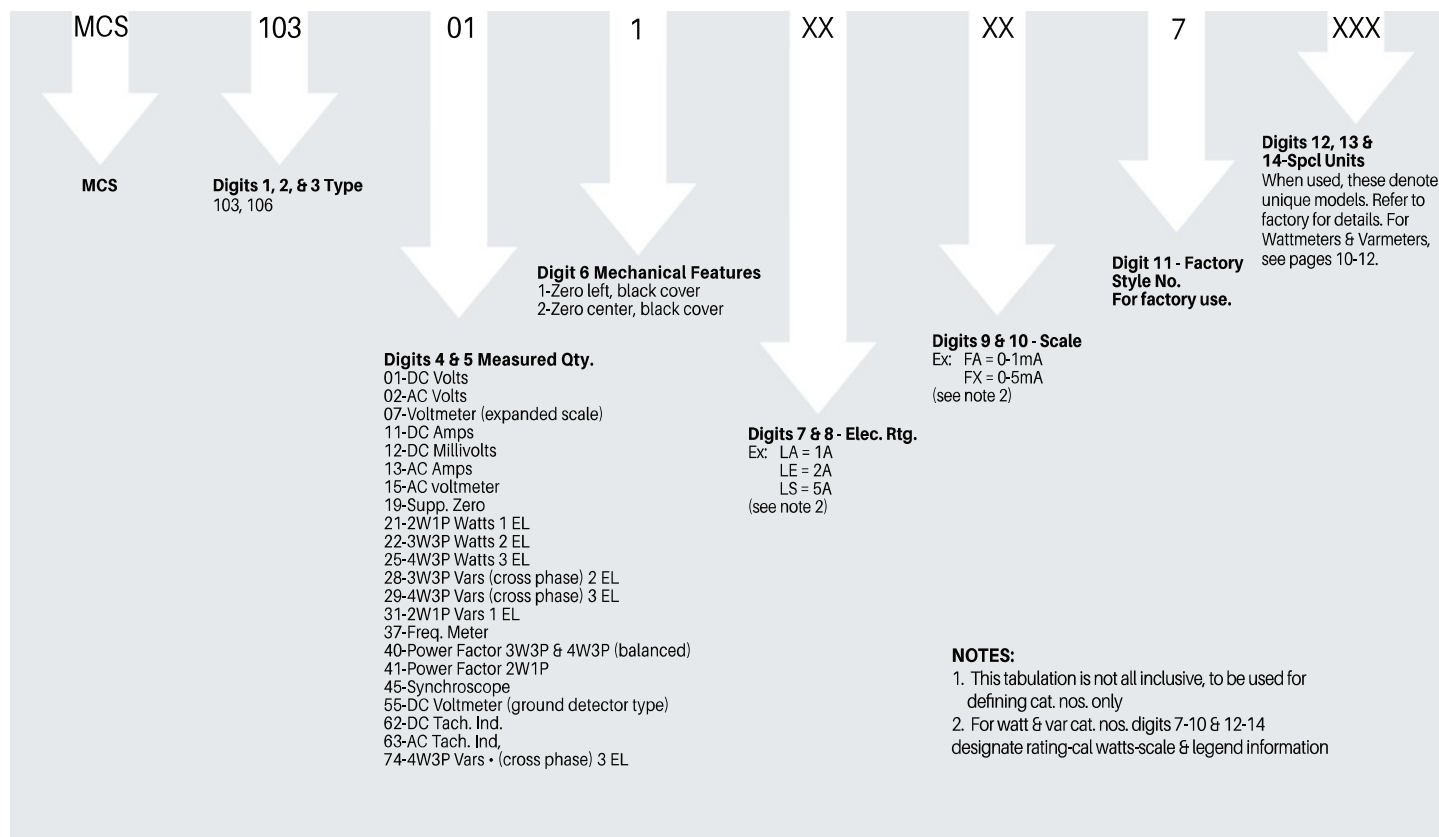
Overload rating: AC & DC Ammeters - 1.2 x continuous, 10 x for 0.5 seconds, repeated 10 times with 1 minute interval.

Ac & DC Voltmeters and frequency meters - 1.2 x continuous

Response time: 3 seconds maximum

Ordering System

Key to MCS Switchboard Numbering System (See Notes)



How to Order - Specify the following:

- Complete Part Number or Ordering number or ;
- Provide significant portion of catalog number with word description for differences (e.g. "Similar to MCS103111FAFA, except scale 0-100 kilovars"), or ;
- Provide word description including the following information:

Type: MCS
Rating (Input):.....Amperes AC or DC.....
Volts AC or DC.....
Frequency: 60 Hz, 50 Hz, 400 Hz.....Hz
Scale: Min. Value - Max. Value, Zero left, Zero-center or offset zero
Legend: Specify words and/or symbols exactly
Potential Transformer Ratio:to 120 volts ortovolts
Current Transformer Ratio:to 5 amperes ortoamperes
Circuit: 2-wire/single-phase, 3-wire/3 phase, 3-phase/4-wire.....other
External Devices: phase Shifting transformers, shunts transducers, etc
Other Options:.....
Special features

Shipping & Storage Weights

Instrument		MCS			
		Net		Ship	
		(lbs)	kg)	(lbs)	kg)
DC-A/V		1.5	.70	2.4	1.1
AC	V	1.7	.79	2.7	1.2
	A	1.8	.84	2.7	1.2
WATT/ VAR	1Ø	2.8	1.3	3.6	1.7
	3Ø3W 3Ø4W	3.0	1.4	3.9	1.8
Power Factor		2.0	.95	3.0	1.4
Frequency		1.8	.82	2.7	1.2
Tachometer		1.6	.80	2.7	1.2
Synchroscope		3.9	1.8	4.8	2.2

Approximate Package Size in Inches / Centimeters

All MCS6x 6x 11/15x 15 x 28
Shipping7x 7 x 13/18 x 18 x33

DC Voltmeters

DC Voltmeters

Rating and Scale (Volts)	Part Number	Ordering Number
Zero-Left (Sensitivity is 1000 OHMS / Volt)		
0-15	MCS 103 011 NDND	1D0065
0-30	MCS 103 011 NLNL	1D0066
0-50	MCS 103 011 NTNT	1D0067
0-75	MCS 103 011 PBPB	1D0068
0-150	MCS 103 011 PZPZ	1D0069
0-300	MCS 103 011 RXRX	1D0070
0-400	MCS 103 011 SCSC	1D0071
0-500	MCS 103 011 SFSF	1D0072
0-600	MCS 103 011 SJSJ	1D0073
Zero-Center (Sensitivity is 2000 OHMS / Volt)		
150-0-150	MCS 103 012 PZPZ	1D0074
300-0-300	MCS 103 012 RXRX	1D0075
500-0-500	MCS 103 012 SFSF	1D0076
600-0-600	MCS 103 012 SJSJ	1D0077
Ground Detector Type - Zero-Center for 2 wire		
150-0-150*	MCS 103 552 PZ*	TBD
300-0-300*	MCS 103 552 RX*	TBD
500-0-500*	MCS 103 552 SF*	TBD
600-0-600*	MCS 103 552 SJ*	TBD

* Specify scale by order.

Tachometer Indicators

DC Volts

Part Number

Select nearest higher rated DC Voltmeter from above and specify requirements.

MCS 103 621 XXXX

AC Volts

Select nearest higher rated rectifier type AC voltmeter from Page 5 and specify requirements.

MCS 103 631 XXXX



Burden Data - AC Meters

Type	Impedance in Ohms	Dielectric withstand	Overload rating	Volt - ampere	Power Factor
For Potential circuit					
AC Voltmeter	45.5 Kohms @ 120VAC	2300VAC between electronic circuit and case for 1 minute	X1.2 continuous	< 0.8 VA @ 150V	-----
AC Wattmeter or Var meter	For 3 phase 3 wire Wattmeter 316 K ohm @ 110V For 3 Phase 3 wire Var Meter 273.4 Kohm @ 110V	2600VRMS between electronic circuit and case for 1 minute	Voltage X 2 rating for 5 second Voltage x 1.2 continuous	< 4.5VA for Voltage circuit	1.0
AC Power Factor Meter	For 1 phase PF meter 95.2 K ohm @ 110V For 3 phase PF meter 124.9Kohm @ 415V	2600VRMS between electronic circuit and case for 1 minute	Voltage X 2 rating for 5 second Voltage x 1.2 continuous	< 4.5 VA for Voltage circuit	1.0
Frequency Meter	> 1 Mohm	2300VAC between electronic circuit and case for 1 minute	-----	-----	-----
Synchroscope	TBD	TBD	TBD	TBD	TBD
For Current circuit					
AC Ammeter	0.005 ohms @ 10A	2300VAC between electronic circuit and case for 1 minute	X2 continuous, X 10 for 1 second	< 0.5 VA	-----
AC Wattmeter or Var meter	For 3 phase 3 wire Wattmeter 0.1 ohm @ 1A For 3 Phase 3 wire Var Meter 0.1ohm @ 1A	2600VRMS between electronic circuit and case for 1 minute	Current X10 rating for 5 second, Current X 1.2 continuous	< 2 VA for Current circuit	1.0
AC Power Factor Meter	For 3 phase 3 wire Wattmeter 0.1 ohm @ 1A For 3 Phase 3 wire Var Meter 0.1ohm @ 1A	2600VRMS between electronic circuit and case for 1 minute	Current X10 rating for 5 second, Current X 1.2 continuous	< 2 VA for Current circuit	1.0

*Data based on a per-element basis

Burden Data - DC Meters

DC Voltmeters

Rating (Volts)	Sensitivity (Ohms Per Volt)
50mV - 800V	1,000 ohms / volt for left zero and 2,000 ohms / volt for centre zero

Rating (mV)	Calibrated for 2-way Lead Resistance of 0.04 Ohms as standard**	Ohms Terminal Resistance $\pm$ 15%
0-50	0.04	12.50 ohm
50-0-50	0.04	25.0 ohm
0-100	0.04	25.0 ohm
100-0-100	0.04	50 ohm

DC Milliammeters / Ammeter

Current Rating	Ohms Terminal Resistance $\pm$ 15%
0 - 1 mA	500 ohm
0 - 5 mA	7 ohm
0 - 15 mA	3 ohm
0 - 1 A	0.075 ohm

DC Microammeters

Rating (μ A)	Ohms Terminal Resistance $\pm$ 15%
0-200	10 Kohm
0-400	2.52 Kohm
0-500	2.5 Kohm