

Filter Dirt Alarm® Selection Appendix A

Schroeder-designed dirt alarms provide a vital measure of protection to your system by indicating the appropriate time for element replacement. For your convenience, this Appendix has been organized to help you determine which Schroeder Dirt Alarm will be most suitable for your application.

Step 1: Review the charts on pages 329-331 which have been devised to show which alarms are available for a particular filter. Chart 1 addresses indicators for Schroeder high pressure filters found in Section 3 of this catalog. Chart 2 shows HydraSpin and medium pressure filters found in Sections 4 and 5. Charts 3 and 4 show the indicators available for tank-mounted, return line, and medium pressure filters of Sections 4, 5, 6 and 7. To facilitate the process of selecting an indicator, we have classified our indicators into the following six categories:

- Visual
- Visual with Thermal Lockout
- Electrical
- Electrical with Thermal Lockout
- Electrical Visual
- Electrical Visual with Thermal Lockout

These six classifications appear at the top of each of the charts to assist in the selection process.

Step 2: APPLIES ONLY TO ELECTRICAL INDICATORS. Narrow down the possibilities of electrical indicators by reviewing the contents of Charts 4 and 5 on page 331, which identify voltages and current ranges for electrical indicators.

Step 3: Review the descriptions, photographs, part numbers and specifications (where applicable) on pages 332-337 to verify your dirt alarm selection.

Step 4: APPLIES ONLY TO ELECTRICAL INDICATORS. Review the cross reference of old electrical indicator part numbers to the new ones on pages 338-341.

CHART 1 Pressure Filters

Filter	Visual				Visual with Thermal Lockout		Electrical				Electrical with Thermal Lockout				Electrical Visual				Electrical Visual with Thermal Lockout									
	D	D5	D5C (in cap)	D5R	D9	D9C (in cap)	D8	D8C (in cap)	D8R	MS5 / MS5LC	MS10 / MS10LC	MS11	MS12 / MS12LC	MS15DC / MS15DCNC	MS16 / MS16LC	MS17LC	MS5T / MS5LCT	MS10T / MS10LCT	MS12T / MS12LCT	MS16T / MS16LCT	MS17LCT	MS	MS2	MS3	MS13	MS14	MS13DCT / MS13DCLCT	MS14DCT / MS14DCLCT
NF30	✓	✓					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓
NFS30	✓	✓					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓
YF30		✓					✓			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓
DF40	✓	✓					✓			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
PF40		✓					✓			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
CF40	✓	✓					✓			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
RF60		✓					✓			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	3
RFS50		✓					✓			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
CF60		✓					✓			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
VF60		✓					✓			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
KF30	✓	✓	✓				✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
TF50	✓	✓	✓				✓	✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
KF50	✓	✓	✓				✓	✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
KC50	✓	✓	✓				✓	✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
KC65					✓	✓				✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓						
KFH50	✓	✓	✓				✓	✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
MKF50	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
FOF60-03		✓					✓			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
NOF30-05		✓					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
NOF50-760		✓					✓			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓

CHART 2 HydraSPIN and Medium Pressure Filters

Filter	Visual					Electrical				
	L	R	B	VA	VM	M	DO	DTC	DTO	DW
GH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RLD					✓					✓

Appendix A Filter Dirt Alarm® Selection: Step 1

CHART 3 Tank-Mounted, Return Line and Medium Pressure Filters

Filter	Visual							Electrical								
	D	Y	YR	Y2	Y2R	Y2C	Y5	V5	V5R	V51	ES	ESR	ES1	ES1R	ES6	ESC
ST		✓	✓					✓	✓	✓						
MTA						✓	✓									✓
MTB						✓	✓									✓
ZT				✓		✓	✓				✓		✓			
KT		✓														✓
RT				✓	✓	✓	✓				✓	✓	✓	✓		
RTI				✓	✓	✓	✓					✓	✓	✓	✓	
LRT				✓	✓	✓	✓				✓	✓	✓	✓	✓	
BFT				✓	✓							✓	✓	✓	✓	
PAF1				✓								✓				
MAF1				✓							✓					
IRF				✓	✓						✓	✓	✓	✓		
KF3	✓															
WKF3	✓															
TF1	✓															
LF1-2"	✓															
MLF1	✓															
KF8	✓															
TF-SKB		✓						✓		✓						
KF3-SKB		✓						✓		✓						
BFT-SKB		✓	✓					✓	✓	✓						

CHART 4 Tank-Mounted, Return Line and Medium Pressure Filters

Filter	Visual								Visual with Thermal Lockout	Electrical							Electrical with Thermal Lockout	Electrical Visual				Electrical Visual with Thermal Lockout						
	DPG	D5	D5C	D5R	D9	D9C	D8	D8C		D8R	MS5 / MS5LC	MS10 / MS10LC	MS11	MS12 / MS12LC	MS15DC / MS15DCNC	MS16 / MS16LC		MS17LC	MS5T / MS5LCT	MS10T / MS10LCT	MS12T / MS12LCT		MS16T / MS16LCT	MS17LCT	MS	MS2	MS13	MS14
MF2		✓					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
KF3		✓					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
KL3		✓					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TF1		✓					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LF1-2"		✓					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MLF1		✓					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SRLT		✓					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RLT		✓					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
KF8		✓					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
QT			✓					✓		✓ _c	✓ _c	✓ _c	✓ _c		✓ _c	✓ _c	✓ _c	✓ _c	✓ _c	✓ _c	✓ _c	✓ _c	✓ _c	✓ _c	✓ _c	✓ _c	✓ _c	✓ _c
QF5	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3QF5	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
QF15	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
QLF15	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SSQLF15	✓				✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
QFD5	✓	✓	✓				✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
K9		✓	✓				✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2K9		✓	✓				✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3K9		✓	✓			✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓_c=cap installation only.

Filter Dirt Alarm® Selection: Step 2 Appendix A

Electrical Ratings: Electrical Cartridge Indicators Without Thermal Lockout

CHART 5			MS5	MS5LC	MS10	MS10LC	MS11	MS12	MS12LC	MS13DC	MS13DCLC	MS14DC	MS14DCLC	MS15DC	MS15DCNC	MS16	MS16LC	MS17LC	MS13AC	MS13ACL	MS14AC	MS14ACL
Voltage	Voltage Volts @ Amps	Current Range (amps)																				
AC	240 @ 3	0.02 to 3	✓		✓		✓	✓											✓		✓	
AC	220 @ 0.05	0.005 to 0.05		✓		✓			✓													
AC	120 @ 4A																					✓
AC	120 @ 5	0.02 to 5	✓		✓		✓	✓											✓			
AC	120 @ 0.05	0.005 to 0.05		✓		✓			✓												✓	✓
AC	24 @ 0.10	0.005 to 0.10		✓		✓			✓												✓	✓
AC	12 @ 0.25	0.005 to 0.25		✓		✓			✓												✓	✓
DC	110 @ 0.3	0.02 to 0.3	✓		✓		✓	✓								✓						
DC	110 @ 0.05	0.005 to 0.05		✓		✓			✓								✓	✓				
DC	24 @ 2	0.002 to 2	✓		✓		✓	✓		✓		✓				✓						
DC	24 @ 0.20	0.0 to 0.20												✓	✓							
DC	24 @ 0.10	0.005 to 0.10		✓		✓			✓		✓		✓				✓	✓				
DC	12 @ 2	0.02 to 2	✓		✓		✓	✓		✓		✓				✓						
DC	12 @ 0.25	0.005 to 0.25		✓		✓			✓		✓		✓				✓	✓				

Electrical Ratings: Electrical Cartridge Indicators With Thermal Lockout*

CHART 6			MS5T	MS5LCT	MS10T	MS10LCT	MS12T	MS12LCT	MS13DCT	MS13DCLCT	MS14DCT	MS14DCLCT	MS16T	MS16LCT	MS17T	MS17LCT	MS13ACT	MS13ACLCT	MS14ACT	MS14ACLCT	
Voltage	Voltage Volts @ Amps	Current Range (amps)																			
AC	120 @ 4																			✓	
AC	120 @ 5	0.02 to 5	✓		✓		✓										✓				
AC	120 @ 0.05	0.005 to 0.05		✓		✓		✓											✓		✓
DC	24 @ 2	0.02 to 2	✓		✓		✓		✓		✓		✓		✓						
DC	24 @ 0.10	0.005 to 0.10		✓		✓		✓		✓		✓		✓		✓					
DC	12 @ 2	0.02 to 2	✓		✓		✓		✓		✓		✓		✓						
DC	12 @ 0.25	0.005 to 0.25		✓		✓		✓		✓		✓		✓		✓					

*Thermal lockout prevents activation below 80°F.

Note: All indicators in Charts 4 and 5 above, except MS15, meet NEMA4X and IP65 specifications.

Visual

Visual indicators provide an economical way to know at a glance when a filter element needs to be replaced. A variety of styles are available, ranging from gauges to mechanical pointers and pop-up cartridges.

Schroeder pointers use a tri-color disk to indicate the element condition. The pointer will reach the red section just before bypassing occurs.

In the case of a mechanical magnetic cartridge, a highly visible orange disk springs, or “pops up”, at the pre-defined setting. Once activated, the orange signal continues to indicate a bypass or clogged condition, even following equipment shutdown, until it is manually reset. The pop-up indicator is interchangeable with other cartridge style indicators (electrical and electrical visual) available from Schroeder. A high pressure (>6000 psi working pressure) of the pop-up indicator is available and is noted below.



D—Tri-color Pointer Dirt Alarm®
P/N A-LF-283CP-1 for plastic pointer only.
For internal linkage and name plate, contact factory.



D5—Orange Pop Up Visual Indicator P/N A-LF-2547
D5C—Same as D5 but mounted in cap P/N A-LF-2547
D5R—Same as D5 but mounted on opposite side of standard location P/N A-LF-2547
D9—Stainless Steel version of D5
D9C—Stainless Steel version of D5 mounted in cap



Y—Vacuum Gauge mounted in porting head
P/N LFT-363
YR—Same as Y but mounted on opposite side of standard location P/N LFT-363



Y2—Back mounted 1/8" NPT Tri-color Glycerin-filled Gauge (0-60 psi) P/N LFT-134-2
Y2R—Same as Y2 but mounted on opposite side of standard location P/N LFT-134-2
Y2C—Bottom mounted 1/8" NPT Tri-color Gauge (0-60 psi) located in cap P/N LFT-134-3
Y5—Same as Y2 but located in cap P/N LFT-134-2
For 0-100 psi gauge, contact factory.



G2214: 0-30 psid; G2213: 0-50 psid;
G2215: 0-70 psid
Photo above for G2214. Other 2 gauges are identical in appearance except for scale.



DPG—Standard Differential Pressure Gauge
P/N LF-6206

Visual with Thermal Lockout

The thermal lockout feature prevents activation of the indicator below temperatures of 90°F (32°C). This is a welcome feature in mobile applications where fluid temperatures may be well below 90°F at equipment start-up, and will prevent the indicator from showing a premature need to change the element. Schroeder's D8 indicator is identical to the D5 visual indicator with the addition of the thermal lockout functionality.



D8—Orange Pop Up Visual Indicator with Thermal Lock-out P/N A-LF-3870
D8C—Same as D8 but mounted in cap P/N A-LF-3870
D8R—Same as D8 but mounted on opposite side of standard location P/N A-LF-3870

Filter Dirt Alarm® Selection: Step 3 Appendix A

Electrical Visual

In addition to providing an electrical signal to provide a desired action, Schroeder electrical visual indicators also provide a visual indication of when an element needs to be changed. In the case of the MS, MS2, and MS3 switches, the visual indicator is a color-coded disk, whereas the MS13 and MS14 dirt alarms provide a light.

MS—Cam operated electrical switch P/N LF-376 for switch only.
For cam, color-coded disk, and mounting bracket, order P/N A-LF-831-1#. For internal linkage, contact factory.



MS2—Cam operated electrical switch P/N LF-1540 for switch only.
For cam, color-coded disk, and mounting bracket, order P/N A-NF-132.



Code	Type of Contact	Electrical Rating	Connection
MS	SPDT	15 Amps @ 125/250 VAC, 0.5 Amp @ 125 VDC	1/2" conduit, female
MS2	SPDT	3 Amps @ 12 VDC inductive, 3 Amps @ 12 VDC resistance, 10.1 Amps @ 125/250 VAC	10" Pigtail

MS3—Enclosed switch with neoprene gasket and elastomer boot. P/N LF-889 for switch only.
For mounting kit, order P/N A-LF-1511. For pointer, order P/N LF-1080.



The electrical indicators (MS Series) provide an electrical signal for activating various electric alarm systems or complete machine shutdown. These cartridge-style indicators are available on most Schroeder pressure, return line, and medium pressure filters and can be used for working pressures up to 5000 psi (345 bar) and cyclic conditions up to 4000 psi (276 bar).

- The design is modular; all electrical indicators, with the exception of the MS15, consist of an MS10 indicator with the corresponding mating connector added to convert the MS10 to a MS5, MS11 etc.
- The standard micro switch for high current indicators is good for both AC and DC use. A separate micro switch with "gold" contacts is used for low current applications. This means that specification of AC or DC is no longer required (except for MS13 and MS14) in the indicator code or part number.
- Housings of all electrical indicators are made of aluminum.
- The indicator model tag includes the electrical wiring diagram.
- All of our indicators, with the exception of MS16, have a "ground" terminal.
- We are now able to offer the thermal lockout option to high current indicators.
- All indicators, with the exception of MS15, can be installed in a filter cap as the wiring harness can be disconnected at the "DIN" connector in order to remove the filter cap.
- All MS indicators, with the exception of MS15, have achieved the NEMA4X and IP65 ratings.

Information on these indicators, including drawing, circuit diagram, and photograph is provided on the following pages.

Electrical

A different set of electrical pressure switches is available for Schroeder tank-mounted filters, along with heavy duty versions.

Schroeder suction filters (ST and models that house the SKB magnetic suction strainer) can be equipped with a vacuum switch.



VS—Vacuum Switch (1/8" NPT) P/N A-LFT-305

VSR—Same as VS but mounted on opposite side of standard location P/N A-LFT-305

ES—Standard electrical pressure switch (1/8" NPT) for tank-mounted filters P/N A-LF-927

ESC—Electrical pressure switch (MTA & MTB only) P/N A-LF-927

ESR—Same as ES but mounted on opposite side of standard location P/N A-LF-927



ES1—Heavy duty electrical pressure switch (1/8" NPT) with conduit connection P/N LFT-1010 (Black = common; Red = N.O.; Blue = N.C.)

ES1R—Same as ES1 but mounted on opposite side of standard location P/N LFT-1010

VS1—Heavy Duty Vacuum Switch (1/8" NPT) P/N LFT-1107

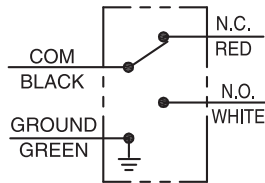
Code	Type of Contact	Electrical Rating	Connection
ES	SPST	8 Amps @ 12 VDC, 1 Amp @ 120 VAC 4 Amps @ 24 VDC, 0.5 Amp @ 240 VAC	Screw Terminal with Rubber Boot
ES1	SPDT	10 Amps @ 115 VAC 50mA-5A @ 24 VDC	1/2" Conduit, Male

Electrical and
Electrical with
Thermal Lockout

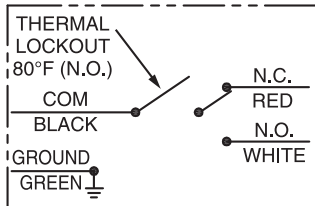


**MS5
MS5LC
MS5T
MS5LCT**

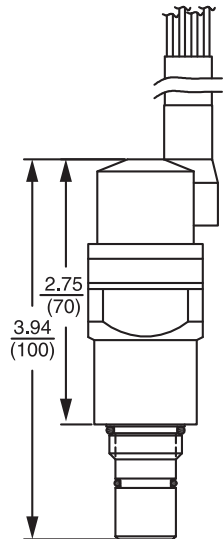
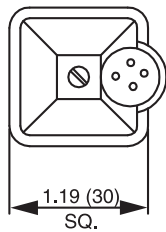
Supplied with 12 inch long
18 gauge 4-conductor cable



MS5/MS5LC

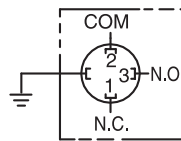


MS5T/MS5LCT

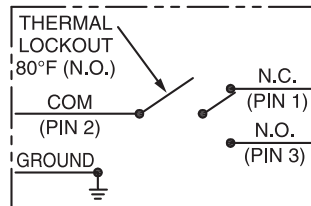


**MS10
MS10LC
MS10T
MS10LCT**

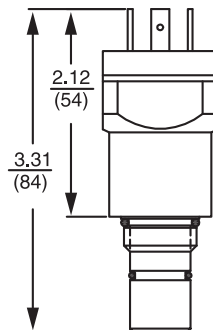
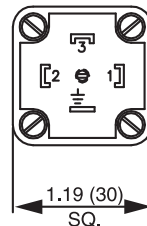
Supplied with DIN connector
(male end only)
(conforming to DIN 43650)



MS10/MS10LC



MS10T/MS10LCT

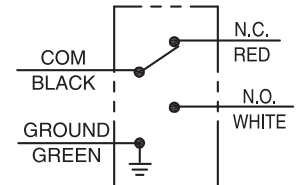


Model Codes of MSHA Version of
MS10 are MS10DCM and MS10DCCM
(DC only; second C designates cap).
For electrical and dimensional
drawings, contact factory.

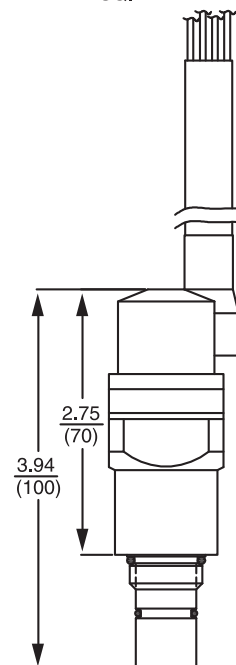
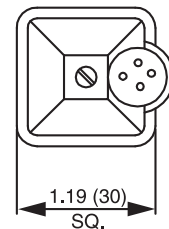


MS11

Supplied with 12 foot long
18 gauge 4-conductor cable



MS11



Filter Dirt Alarm® Selection: Step 3 Appendix A



Electrical and
Electrical with
Thermal Lockout
(cont'd.)

**MS12
MS12LC
MS12T
MS12LCT**

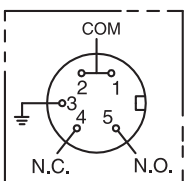
MS15DC

MS15DCNC

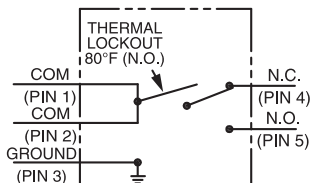
Supplied with 5 pin
Brad Harrison connector
(male end only)

NORMALLY OPEN
for DC use only
(max. working pressure 3000 psi)

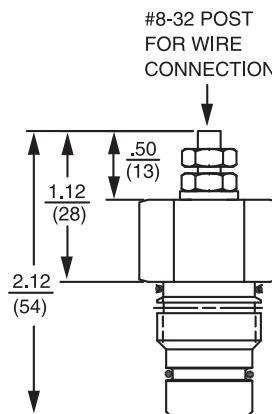
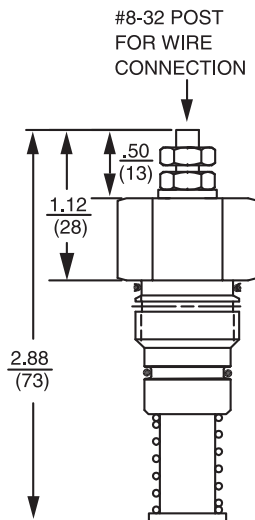
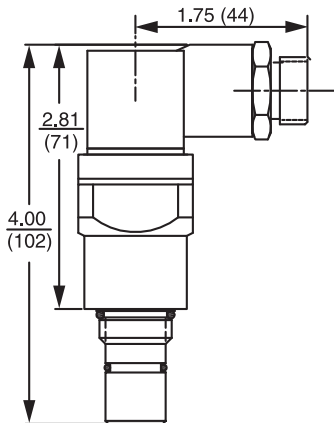
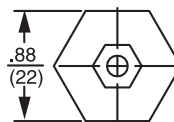
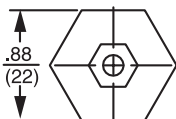
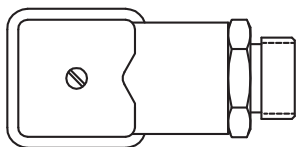
NORMALLY CLOSED
for DC use only
(max. working pressure 3000 psi)



MS12/MS12LC



MS12T/MS12LCT



Model Codes of MSHA Version of MS12 are MS12DCM and MS12DCCM (DC only; second C designates cap). For electrical and dimensional drawings, contact factory.

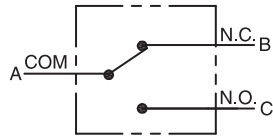
Appendix A Filter Dirt Alarm® Selection: Step 3

Electrical and Electrical with Thermal Lockout (cont'd.)

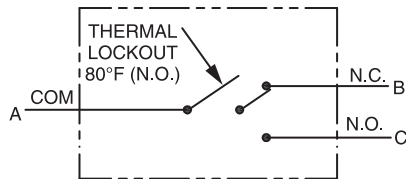


**MS16
MS16LC
MS16T
MS16LCT**

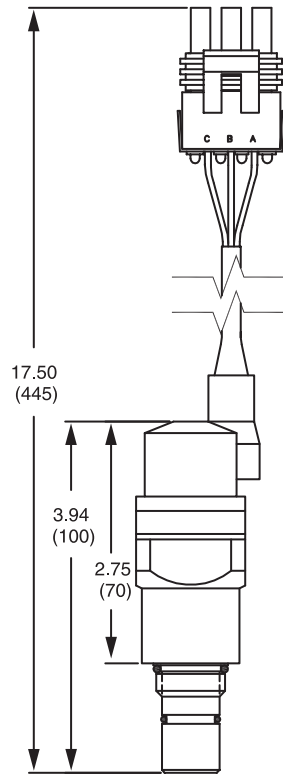
Supplied with a female (3) contact weather-packed sealed connector



MS16/MS16LC

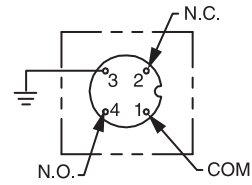


MS16T/MS16LCT

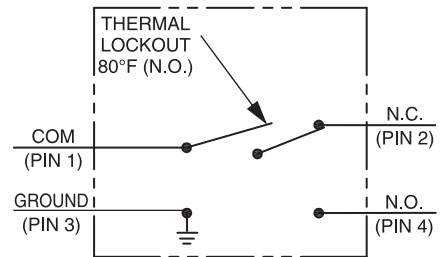


**MS17LC
MS17LCT**

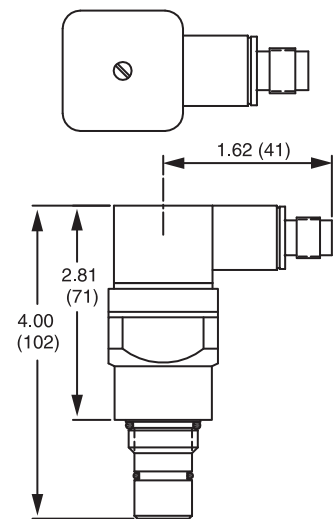
Supplied with a 4 pin Brad Harrison "micro" connector (male end only)



MS17LC



MS17LCT



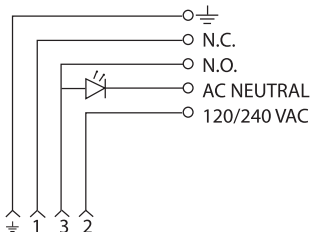
Filter Dirt Alarm® Selection: Step 3

Appendix A

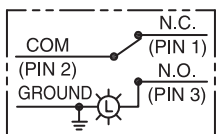


**MS13AC, MS13ACLC,
MS13ACLCT
MS13DC, MS13DCLC
MS13DCT, MS13DCLCT**

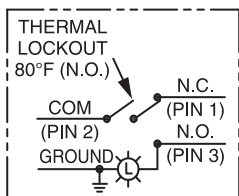
Supplied with threaded connector with light



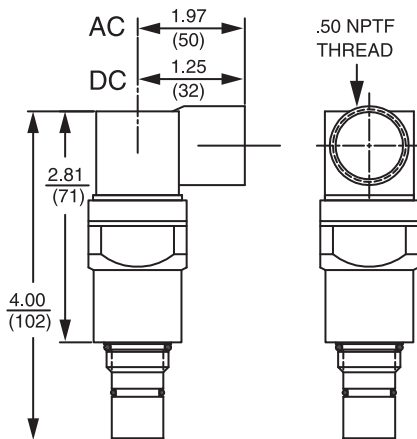
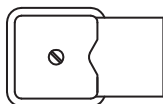
MS13AC, MS13ACLC, MS13ACLCT



MS13DC / MS13DCLC

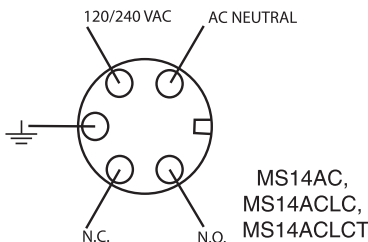


MS13DCT / MS13DCLCT

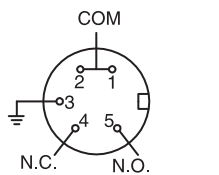


**MS14AC, MS14ACLC,
MS14ACLCT
MS14DC, MS14DCLC
MS14DCT, MS14DCLCT**

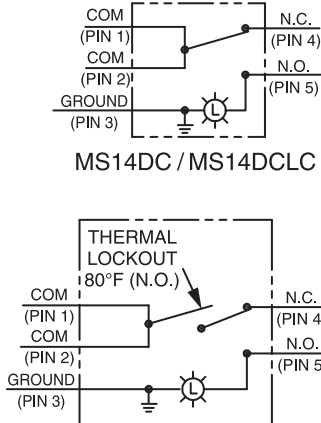
Supplied with 5 pin Brad Harrison connector with light (male end only)



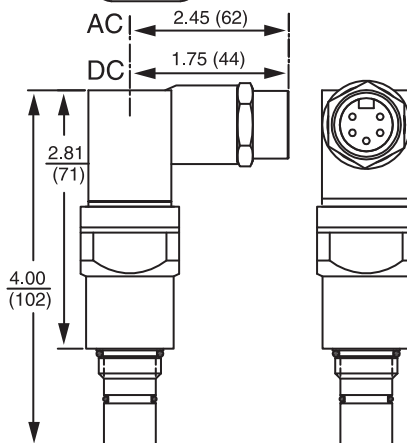
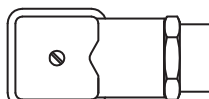
MS14AC, MS14ACLC, MS14ACLCT



MS14DC / MS14DCLC



MS14DCT / MS14DCLCT



Electrical Visual and Electrical Visual with Thermal Lockout

Cross Reference of Old to New Indicators: Part Numbers and Codes

Part Numbers for Indicators Purchased Separately

The part numbering system for indicators purchased individually has been greatly simplified and consists simply of the indicator code followed by the indicator's nominal setting.

Example: KF301KZ10PMS5

Indicator code in filter assembly is MS5; P/N for same indicator purchased separately is MS5-40 for a bypass setting of 40 psi.

A cross reference of old electrical indicator part numbers to the new ones follows.

Old Part Number	Old Indicator Code	New Part Number	New Indicator Code
MS5			
A-LF-2548AC-15	MS5AC	MS5-15	MS5
A-LF-2548AC-20	MS5AC	MS5-20	MS5
A-LF-2548AC-25	MS5AC	MS5-25	MS5
A-LF-2548AC-30	MS5AC	MS5-30	MS5
A-LF-2548AC-40	MS5AC	MS5-40	MS5
A-LF-2548AC-50	MS5AC	MS5-50	MS5
A-LF-2548AC-60	MS5AC	MS5-60	MS5
A-LF-2548AC-75	MS5AC	MS5-75	MS5
A-LF-2548AC-90	MS5AC	MS5-90	MS5
A-LF-2548BAC-30	MS5AC	MS5B-30	MS5
A-LF-2548BAC-40	MS5AC	MS5B-40	MS5
A-LF-2548BAC-50	MS5AC	MS5B-50	MS5
ALF2548BAC50H.5	MS5AC	MS5H.5-50	MS5
A-LF-2548CAC-30	MS5AC	MS5C-30	MS5
ALF-2548SSAC-30	MS5AC	MS5SS-30	MS5
A-LF-2548VAC-30	MS5AC	MS5V-30	MS5
A-LF-2548VAC-40	MS5AC	MS5V-40	MS5
A-LF-2548VAC-50	MS5AC	MS5V-50	MS5
A-LF-2548VAC-75	MS5AC	MS5V-75	MS5
A-LF-2548DC-15	MS5DC	MS5-15	MS5
A-LF-2548DC-20	MS5DC	MS5-20	MS5
A-LF-2548DC-25	MS5DC	MS5-25	MS5
A-LF-2548DC-30	MS5DC	MS5-30	MS5
A-LF-2548DC-40	MS5DC	MS5-40	MS5
A-LF-2548DC-50	MS5DC	MS5-50	MS5
A-LF-2548DC-60	MS5DC	MS5-60	MS5
A-LF-2548DC-75	MS5DC	MS5-75	MS5
A-LF-2548DC-90	MS5DC	MS5-90	MS5
A-LF-2548BDC-30	MS5DC	MS5B-30	MS5
A-LF-2548BDC-40	MS5DC	MS5B-40	MS5
A-LF-2548BDC-50	MS5DC	MS5B-50	MS5
ALF2548BDC30H.5	MS5DC	MS5H.5-30	MS5
ALF2548BDC40H.5	MS5DC	MS5H.5-40	MS5
ALF-2548SSDC-25	MS5DC	MS5SS-25	MS5
ALF-2548SSDC-30	MS5DC	MS5SS-30	MS5
A-LF-2548VDC-30	MS5DC	MS5V-30	MS5
A-LF-2548VDC-40	MS5DC	MS5V-40	MS5
A-LF-2548VDC-50	MS5DC	MS5V-50	MS5
A-LF-2548VDC-60	MS5DC	MS5V-60	MS5
A-LF-2548LC-15	MS5LC	MS5LC-15	MS5LC
A-LF-2548LC-30	MS5LC	MS5LC-30	MS5LC
A-LF-2548LC-40	MS5LC	MS5LC-40	MS5LC
A-LF-2548LC-50	MS5LC	MS5LC-50	MS5LC
A-LF-2548LC-60	MS5LC	MS5LC-60	MS5LC
A-LF-2548LC-75	MS5LC	MS5LC-75	MS5LC
A-LF-2548LC-90	MS5LC	MS5LC-90	MS5LC
A-LF-2548BLC-30	MS5LC	MS5BLC-30	MS5LC
ALF-2548SSLC-30	MS5LC	MS5SSLC-30	MS5LC
ALF-2548SSLC-50	MS5LC	MS5SSLC-50	MS5LC
A-LF-2548VLC-30	MS5LC	MS5VLC-30	MS5LC
A-LF-2548VLC-40	MS5LC	MS5VLC-40	MS5LC
A-LF-2548VLC-50	MS5LC	MS5VLC-50	MS5LC
A-LF-2548LCT-25	MS5LCT	MS5LCT-25	MS5LCT
A-LF-2548LCT-30	MS5LCT	MS5LCT-30	MS5LCT
A-LF-2548LCT-40	MS5LCT	MS5LCT-40	MS5LCT
A-LF-2548LCT-50	MS5LCT	MS5LCT-50	MS5LCT
A-LF-2548LCT-75	MS5LCT	MS5LCT-75	MS5LCT

Filter Dirt Alarm® Selection: Step 4 **Appendix A**

**Cross Reference
of Old to New
Indicators:
Part Numbers
and Codes
(cont.)**

Old Part Number	Old Indicator Code	New Part Number	New Indicator Code
MS10			
A-LF-2919AC-15	MS10AC	MS10-15	MS10
A-LF-2919AC-30	MS10AC	MS10-30	MS10
A-LF-2919AC-40	MS10AC	MS10-40	MS10
A-LF-2919AC-50	MS10AC	MS10-50	MS10
A-LF-2919AC-60	MS10AC	MS10-60	MS10
A-LF-2919AC-75	MS10AC	MS10-75	MS10
A-LF-2919AC-90	MS10AC	MS10-90	MS10
A-LF-2919BAC-40	MS10AC	MS10B-40	MS10
A-LF-2919VAC-30	MS10AC	MS10V-30	MS10
A-LF-2919VAC-40	MS10AC	MS10V-40	MS10
A-LF-2919VAC-50	MS10AC	MS10V-50	MS10
A-LF-2919DC-25	MS10DC	MS10-25	MS10
A-LF-2919DC-30	MS10DC	MS10-30	MS10
A-LF-2919DC-40	MS10DC	MS10-40	MS10
A-LF-2919DC-50	MS10DC	MS10-50	MS10
A-LF-2919DC-60	MS10DC	MS10-60	MS10
A-LF-2919DC-75	MS10DC	MS10-75	MS10
A-LF-2919DC-90	MS10DC	MS10-90	MS10
A-LF-2919BDC-30	MS10DC	MS10B-30	MS10
A-LF-2919BDC-40	MS10DC	MS10B-40	MS10
A-LF-2919BDC-50	MS10DC	MS10B-50	MS10
ALF2919BDC40H.5	MS10DC	MS10H.5-40	MS10
ALF2919BDC50H.5	MS10DC	MS10H.5-50	MS10
A-LF-2919VDC-30	MS10DC	MS10V-30	MS10
A-LF-2919VDC-40	MS10DC	MS10V-40	MS10
A-LF-2919VDC-50	MS10DC	MS10V-50	MS10
A-LF-2919LC-15	MS10LC	MS10LC-15	MS10LC
A-LF-2919LC-20	MS10LC	MS10LC-20	MS10LC
A-LF-2919LC-25	MS10LC	MS10LC-25	MS10LC
A-LF-2919LC-30	MS10LC	MS10LC-30	MS10LC
A-LF-2919LC-40	MS10LC	MS10LC-40	MS10LC
A-LF-2919LC-50	MS10LC	MS10LC-50	MS10LC
A-LF-2919LC-75	MS10LC	MS10LC-75	MS10LC
A-LF-2919LC-90	MS10LC	MS10LC-90	MS10LC
A-LF-2919BLC-40	MS10LC	MS10BLC-40	MS10LC
A-LF-2919BLC-50	MS10LC	MS10BLC-50	MS10LC
ALF-2919LCSS-40	MS10LC	MS10SSLC-40	MS10LC
ALF-2919SSLC-30	MS10LC	MS10SSLC-30	MS10LC
ALF-2919SSLC-50	MS10LC	MS10SSLC-50	MS10LC
A-LF-2919VLC-30	MS10LC	MS10VLC-30	MS10LC
A-LF-2919VLC-40	MS10LC	MS10VLC-40	MS10LC
A-LF-2919VLC-50	MS10LC	MS10VLC-50	MS10LC
A-LF-2919LCT-25	MS10LCT	MS10LCT-25	MS10LCT
A-LF-2919LCT-30	MS10LCT	MS10LCT-30	MS10LCT
A-LF-2919LCT-40	MS10LCT	MS10LCT-40	MS10LCT
A-LF-2919LCT-50	MS10LCT	MS10LCT-50	MS10LCT
A-LF-2919LCT-75	MS10LCT	MS10LCT-75	MS10LCT
ALF-2919LCT-100	MS10LCT	MS10LCT-100	MS10LCT
ALF2919VLCT-30	MS10LCT	MS10VLCT-30	MS10LCT
MS11			
A-LF-3011AC-15	MS11AC	MS11-15	MS11
A-LF-3011AC-30	MS11AC	MS11-30	MS11
A-LF-3011AC-40	MS11AC	MS11-40	MS11
A-LF-3011AC-50	MS11AC	MS11-50	MS11
A-LF-3011AC-90	MS11AC	MS11-90	MS11
A-LF-3011VAC-30	MS11AC	MS11V-30	MS11
A-LF-3011VAC-40	MS11AC	MS11V-40	MS11
A-LF-3011DC-30	MS11DC	MS11-30	MS11
A-LF-3011DC-40	MS11DC	MS11-40	MS11
A-LF-3011DC-50	MS11DC	MS11-50	MS11
A-LF-3011DC-90	MS11DC	MS11-90	MS11
A-LF-3011VDC-30	MS11DC	MS11V-30	MS11
A-LF-3011VDC-40	MS11DC	MS11V-40	MS11

**Cross Reference
of Old to New
Indicators:
Part Numbers
and Codes
(cont.)**

Old Part Number	Old Indicator Code	New Part Number	New Indicator Code
MS12			
A-LF-4498AC-25	MS12AC	MS12-25	MS12
A-LF-4498AC-30	MS12AC	MS12-30	MS12
A-LF-4498AC-40	MS12AC	MS12-40	MS12
A-LF-4498AC-50	MS12AC	MS12-50	MS12
A-LF-4498AC-75	MS12AC	MS12-75	MS12
A-LF-4498VAC-30	MS12AC	MS12V-30	MS12
A-LF-4498VAC-40	MS12AC	MS12V-40	MS12
A-LF-4498VAC-50	MS12AC	MS12V-50	MS12
A-LF-4498DC-30	MS12DC	MS12-30	MS12
A-LF-4498DC-40	MS12DC	MS12-40	MS12
A-LF-4498DC-50	MS12DC	MS12-50	MS12
A-LF-4498DC-75	MS12DC	MS12-75	MS12
A-LF-4498VDC-30	MS12DC	MS12V-30	MS12
A-LF-4498VDC-40	MS12DC	MS12V-40	MS12
A-LF-4498VDC-50	MS12DC	MS12V-50	MS12
A-LF-4498VDC-75	MS12DC	MS12V-75	MS12
A-LF-4498LC-30	MS12LC	MS12LC-30	MS12LC
A-LF-4498LC-40	MS12LC	MS12LC-40	MS12LC
A-LF-4498LC-50	MS12LC	MS12LC-50	MS12LC
A-LF-4498LC-75	MS12LC	MS12LC-75	MS12LC
ALF-4498SSLC-30	MS12LC	MS12SSLC-30	MS12LC
A-LF-4498VLC-30	MS12LC	MS12VLC-30	MS12LC
A-LF-4498VLC-40	MS12LC	MS12VLC-40	MS12LC
A-LF-4498VLC-50	MS12LC	MS12VLC-50	MS12LC
A-LF-4498LCT-40	MS12LCT	MS12LCT-40	MS12LCT
A-LF-4498LCT-75	MS12LCT	MS12LCT-75	MS12LCT
MS13			
A-LF-5099AC1	MS13AC1	MS13AC-30	MS13AC
A-LF-5099AC1-15	MS13AC1	MS13AC-15	MS13AC
A-LF-5099AC1-30	MS13AC1	MS13AC-30	MS13AC
A-LF-5099AC1-40	MS13AC1	MS13AC-40	MS13AC
A-LF-5099AC1-50	MS13AC1	MS13AC-50	MS13AC
A-LF-5099AC1-60	MS13AC1	MS13AC-60	MS13AC
A-LF-5099AC1-90	MS13AC1	MS13AC-90	MS13AC
A-LF-5099AC1LC	MS13AC1LC	MS13ACLC-30	MS13ACLC
ALF-5099AC1LC40	MS13AC1LC	MS13ACLC-40	MS13ACLC
ALF-5099AC1LC-50	MS13AC1LC	MS13ACLC-50	MS13ACLC
ALF-5099AC1LC75	MS13AC1LC	MS13ACLC-75	MS13ACLC
ALF-5099VAC1-30	MS13AC1	MS13VAC-30	MS13AC
ALF-5099VAC1-40	MS13AC1	MS13VAC-40	MS13AC
ALF5099AC1LC-30	MS13AC1LC	MS13ACLC-30	MS13ACLC
ALF5099AC1LC-50	MS13AC1LC	MS13ACLC-50	MS13ACLC
ALF5099AC1LC15	MS13AC1LC	MS13ACLC-15	MS13ACLC
ALF5099AC1LCT30	MS13AC1LC	MS13ACLCT-30	MS13ACLCT
ALF5099AC1LCT40	MS13AC1LC	MS13ACLCT-40	MS13ACLCT
ALF5099AC1LCT50	MS13AC1LC	MS13ACLCT-50	MS13ACLCT
ALF5099VAC1-50	MS13AC1	MS13VAC-50	MS13AC
ALF5099VAC1LC50	MS13AC1LC	MS13VACLC-50	MS13ACLC
ALF5099VAC1LCT3	MS13AC1LC	MS13VACLC-30	MS13ACLCT
A-LF-5099AC2	MS13AC2	MS13AC-30	MS13AC
A-LF-5099AC2-30	MS13AC2	MS13AC-30	MS13AC
A-LF-5099AC2-40	MS13AC2	MS13AC-40	MS13AC
A-LF-5099AC2-50	MS13AC2	MS13AC-50	MS13AC
A-LF-5099DC1-30	MS13DC1	MS13DC-30	MS13DC
A-LF-5099DC1-40	MS13DC1	MS13DC-40	MS13DC
A-LF-5099DC1-50	MS13DC1	MS13DC-50	MS13DC
A-LF-5099DC2-30	MS13DC2	MS13DC-30	MS13DC
A-LF-5099DC2-40	MS13DC2	MS13DC-40	MS13DC

Filter Dirt Alarm® Selection: Step 4

Appendix A

Old Part Number	Old Indicator Code	New Part Number	New Indicator Code
MS13 (cont.)			
A-LF-5099DC2-50	MS13DC2	MS13DC-50	MS13DC
A-LF-5099DC2-60	MS13DC2	MS13DC-60	MS13DC
A-LF-5099DC2-90	MS13DC2	MS13DC-90	MS13DC
ALF-5099VDC2-30	MS13DC2	MS13VDC-30	MS13DC
ALF-5099VDC2-50	MS13DC2	MS13VDC-50	MS13DC
ALF5099DC1LC-40	MS13DC1LC	MS13DCLC-40	MS13DCLC
ALF5099DC2LC-20	MS13DC2LC	MS13DCLC-20	MS13DCLC
ALF5099DC2LC-30	MS13DC2LC	MS13DCLC-30	MS13DCLC
ALF5099DC2LC-40	MS13DC2LC	MS13DCLC-40	MS13DCLC
ALF5099DC2LC-50	MS13DC2LC	MS13DCLC-50	MS13DCLC
AF5099DC2LCSS30	MS13DC2LC	MS13SSDCLC-30	MS13DCLC
AF5099DC2LCSS50	MS13DC2LC	MS13SSDCLC-50	MS13DCLC
ALF5099DC2LCT40	MS13DC2LCT	MS13DCLCT-40	MS13DCLCT
ALF5099DC2LCT50	MS13DC2LCT	MS13DCLCT-50	MS13DCLCT
ALF5099DC2LCT75	MS13DC2LCT	MS13DCLCT-75	MS13DCLCT
MS14			
A-LF-5100AC1-30	MS14AC1	MS14AC-30	MS14AC
A-LF-5100AC1-40	MS14AC1	MS14AC-40	MS14AC
A-LF-5100AC1-50	MS14AC1	MS14AC-50	MS14AC
AF5100SSAC1LC40	MS14AC1LC	MS14SSACLC-40	MS14ACLC
ALF-5100AC1LC30	MS14AC1LC	MS14ACLC-30	MS14ACLC
ALF-5100AC1LC50	MS14AC1LC	MS14ACLC-50	MS14ACLC
ALF-5100VAC1-30	MS14AC1	MS14VAC-30	MS14AC
ALF5100AC1LCT40	MS14AC1LC	MS14ACLCT-40	MS14ACLCT
A-LF-5100AC2-30	MS14AC2	MS14AC-50	MS14AC
A-LF-5100DC1-30	MS14DC1	MS14DC-30	MS14DC
A-LF-5100DC1-40	MS14DC1	MS14DC-40	MS14DC
ALF-5100VDC1-40	MS14DC1	MS14VDC-40	MS14DC
A-LF-5100DC2-30	MS14DC2	MS14DC-30	MS14DC
A-LF-5100DC2-40	MS14DC2	MS14DC-40	MS14DC
A-LF-5100DC2-50	MS14DC2	MS14DC-50	MS14DC
ALF-5100VDC2-30	MS14DC2	MS14VDC-30	MS14DC
ALF-5100VDC2-40	MS14DC2	MS14VDC-40	MS14DC
ALF-5100DC2LC40	MS14DC2LC	MS14DCLC-40	MS14DCLC
ALF-5100DC2LC50	MS14DC2LC	MS14DCLC-50	MS14DCLC
ALF5100VDC2LC40	MS14DC2LC	MS14VDCLC-40	MS14DCLC
ALF5100DC2LCT50	MS14DC2LCT	MS14DCLCT-50	MS14DCLCT
MS16			
A-LF-5799DC-40	MS16DC	MS16-40	MS16
A-LF-5799LC-30	MS16LC	MS16LC-30	MS16LC
A-LF-5799LC-40	MS16LC	MS16LC-40	MS16LC
A-LF-5799LC-50	MS16LC	MS16LC-50	MS16LC
A-LF-5799LCT-40	MS16LCT	MS16LCT-40	MS16LCT
MS17			
A-LF-6288LC-30	MS17LC	MS17LC-30	MS17LC
A-LF-6288LC-40	MS17LC	MS17LC-40	MS17LC
A-LF-6288LC-50	MS17LC	MS17LC-50	MS17LC
A-LF-6288LC-90	MS17LC	MS17LC-90	MS17LC
A-LF-6288VLC-30	MS17LC	MS17VLC-30	MS17LC
A-LF-6288VLC-40	MS17LC	MS17VLC-40	MS17LC
A-LF-6288VLC-50	MS17LC	MS17VLC-50	MS17LC

**Cross Reference
of Old to New
Indicators:
Part Numbers
and Codes
(cont.)**

Appendix B

Patented Non-Bypassing Filtration

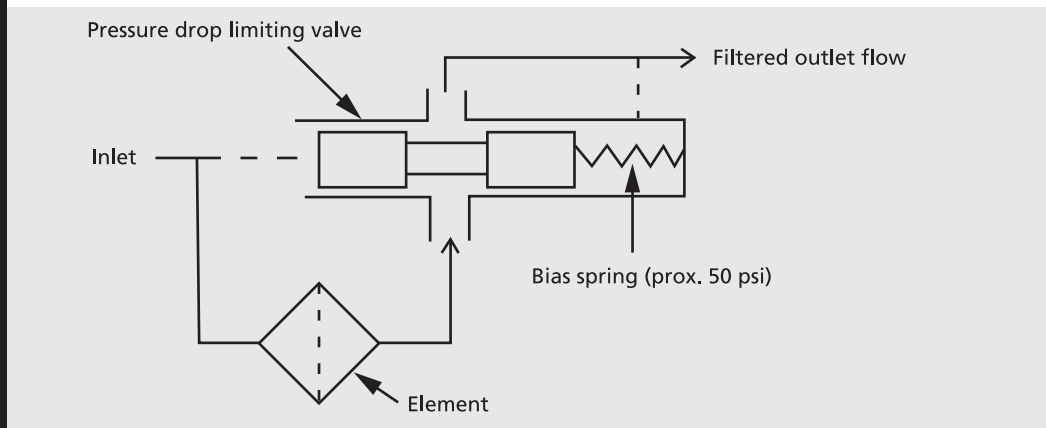
Patented Non-Bypassing Filtration:
A Better Way That Does Not Require High Crush Elements

In circuits where subjecting critical components to unfiltered oil is unacceptable, non-bypassing filters are used. The traditional non-bypassing filter does not include a bypass valve, providing assurance that the circulating oil is subjected to constant filtration. However, the continuous buildup of dirt particles on the filter element causes a steady increase in pressure drop. An extreme differential pressure across the element can crush it, sending dirt as well as fragments of the element downstream. High crush elements are used to solve this problem, but at a premium cost, since a high crush element costs significantly more than its standard counterpart. **Even more importantly, this system is not foolproof, because the possibility remains that someone may inadvertently replace a high-crush element with a standard element, which provides no protection against element collapse.**

There is a better way!

Schroeder's CFX30 series non-bypassing filters incorporate the use of a patented pressure drop limiting valve that maintains the differential pressure across the element below the element's collapse pressure rating. As the element accumulates dirt, the pressure drop increases across the element and, therefore, across the spool of the valve. At about 45 to 50 psi, the spool begins to move, restricting flow as needed to prevent the pressure drop from increasing further and compromising element integrity. As with a high crush element, the flow is eventually restricted to the point that the system will not function properly. However, the filter's dirt alarm® (change-element indicator) will be activated at an element pressure drop of about 30 psi, providing plenty of advance warning that the element is in need of replacement. **As with any non-bypassing filter, a system relief valve should be located upstream of the filter to provide protection in the event the element is not serviced.**

This design allows the CFX30 filters to safely use the lower cost standard elements, eliminating the need for expensive high-crush replacement elements. In addition, the initial cost of this filter and standard elements is less than a comparable blocked bypass filter with a high crush element.



Appendix C

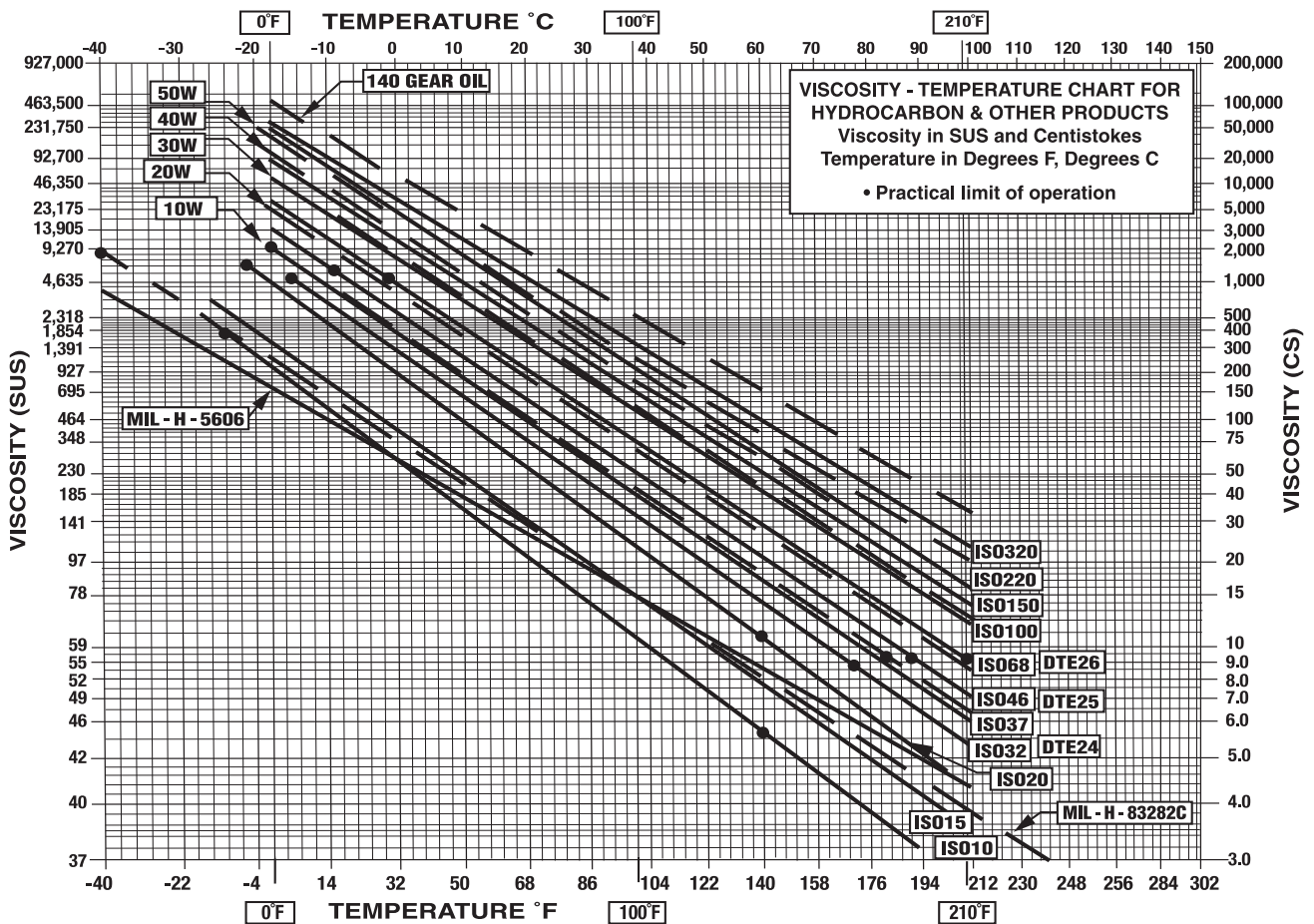
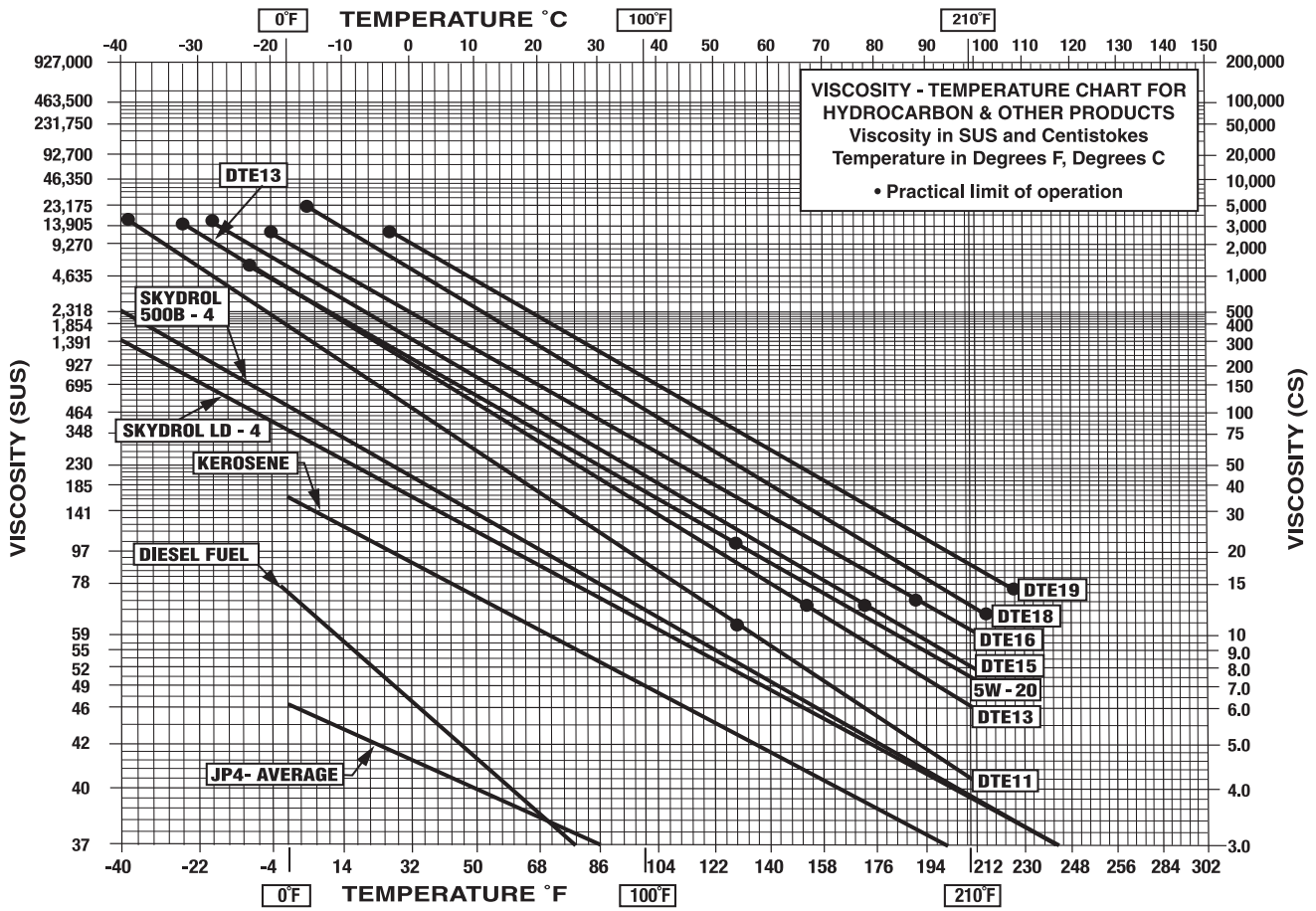
Element Case Weights

In proportion to the high volume of filter elements we make and ship, one of the most frequently asked questions our order desk receives involves the weights of various cases of elements. In an effort to include this information in this edition of the catalog, we made the assumption that the various micron ratings within a media type weigh the same; i.e., a KZ1 weighs approximately the same as a KZ25.

The following table represents our findings given the above assumption.

		Case Lot	Weight (lb.)			Case Lot	Weight (lb.)			Case Lot	Weight (lb.)
A	paper	12	7	K	paper	12	17	8Z	paper	12	12
AZ	synthetic (Z)	12	8	KZ	synthetic (Z)	12	22	8ZZ	synthetic (Z)	12	13
BB	paper	6	29	KW	Water Removal	12	18	9V	synthetic (Z)	12	14
BBZ	synthetic (Z)	6	29	KK	paper	6	18	14V	synthetic (Z)	6	10
C	paper	12	7	KKZ	synthetic (Z)	6	20	14C	synthetic (Z)	6	11
CZ	synthetic (Z)	12	8	27K	paper	6	20	18L	synthetic (Z)	6	20
CC	paper	12	11	M	paper	12	33	39Q	paper	1	17
CCZ	synthetic (Z)	12	15	N	paper	12	4	39QPML	synthetic (Z)	1	18
FZX3	synthetic (Z)	12	3	NZ	synthetic (Z)	12	7	39QCL	synthetic (Z)	1	11
FZX10	synthetic (Z)	12	3	NN	paper	12	6	16Q	paper	1	8
6G	synthetic (Z)	12	8	NNZ	synthetic (Z)	12	9	16QPML	synthetic (Z)	1	15
9G	synthetic (Z)	12	13	6R	synthetic (Z)	12	10	16QCL	synthetic (Z)	1	3

Viscosity Charts Appendix D



Glossary of Standard Terms

ABSOLUTE FILTRATION RATING: The diameter of the largest hard spherical particle that will pass through a filter under specified test condition. This is an indication of the largest opening in the filter element. It does not indicate the largest particle that will pass through the element, since particles of greater length than diameter may pass.

CAVITATION: A localized condition within a liquid stream causing the rapid implosion of a gaseous bubble.

CELSIUS: A temperature scale. 0 Celsius (or 0 Centigrade) is the freezing point of water (32° F).

CENTIPOISE: A unit of absolute (dynamic) viscosity.

CENTISTOKE: A unit of kinematic viscosity.

CLEANLINESS LEVEL: The analog of contamination level.

COLLAPSE PRESSURE: The outside-in differential pressure that causes structural failure.

CONTAMINATION LEVEL: A quantitative term specifying the degree of contamination.

CONTAMINANT: Any material or substance which is unwanted or adversely affects the fluid power system or components, or both.

CONTAMINANT, BUILT-IN: Initial residual contamination in a component, fluid, or system. Typical built-in contaminants are burrs, chips, flash, dirt, dust, fiber, sand, moisture, pipe dope, weld spatter, paints and solvents, flushing solutions, incompatible fluids, and operating fluid impurities.

DEPTH (FILTER): A filter medium which primarily retains contaminant within tortuous passages.

DIRT CAPACITY (DUST CAPACITY)

(CONTAMINANT CAPACITY): The weight of a specified artificial contaminant which must be added to the fluid to produce a given differential pressure across a filter at specified conditions. Used as an indication of relative service life.

EFFICIENCY (FILTER): The ability, expressed as a percent, of a filter to remove specified artificial contaminant at a given contaminant concentration under specified test conditions.

ELEMENT (CARTRIDGE): The porous device which performs the actual process of filtration.

FLOW, LAMINAR (STREAMLINE): A flow situation in which fluid moves in parallel lamina or layers. (See Reynold's number.)

FLOW, TURBULENT: A flow situation in which the fluid particles move in a random manner. (See Reynold's number.)

FLUID: A liquid, gas, or combination thereof.

FLUID POWER SYSTEM: A system that transmits and controls power through use of a pressurized fluid within an enclosed circuit.

INDICATOR: A device which provides external visual evidence of sensed phenomena.

INDICATOR, BY-PASS: An indicator which signals that an alternate flow path is being used.

INDICATOR, DIFFERENTIAL PRESSURE: An indicator which signals the difference in pressure between two points.

MICROMETER (MICRON)*: A unit of measurement one millionth of a meter long, or approximately 0.00003937 inch expressed in English Units. *Deprecated.

MIGRATION: Contaminant released downstream.

PRESSURE, CRACKING: The pressure at which a pressure-operated valve begins to pass fluid.

PRESSURE, DIFFERENTIAL (PRESSURE DROP): The difference in pressure between any two points of a system or a component.

PRESSURE, OPERATING: The pressure at which a system is operated.

PRESSURE, RATED FATIGUE: A pressure that a pressure-containing component is represented to sustain 10 million times without failure.

RATED FLOW: The maximum flow that the power supply system is capable of maintaining at a specific operating pressure.

REYNOLD'S NUMBER: A numerical ratio of the dynamic forces of mass flow to the shear stress due to viscosity. Flow usually changes from laminar to turbulent between Reynold's numbers 2,000 and 4,000.

FILTER CONFIGURATIONS

Top-Ported Filter: Also known as a T-Ported or In-Line filter. All porting, the bypass valve, and indicators are located in the head. The head is permanently attached to the plumbing and the element is accessed by removing the bowl.

Base-Ported Filter: All porting, the bypass valve, and indicators are located in the base. The base is permanently attached to the plumbing and the element is removed through a cap, instead of removing the entire bowl.

Manifold Mounted Filter: Also known as a Sub-Plate filter. Most Base-Ported filters come with a manifold mount option. In some cases, a Top-Ported filter can also have a manifold mounting option. This allows the filter to be mounted directly onto a manifold, eliminating the need for hoses and fittings.

Cartridge Filter: Can be inserted directly into the manifold, eliminating the need for a separate housing or plumbing. Element is removed through a plug on the manifold.

Sandwich Filter: Is designed to be placed in between and directly interface with a manifold and stacked valves. Eliminates the need for hoses and fittings.

Duplex Filter: Made up of two or more filter assemblies. A valve allows the user to switch from one chamber to another. When one element is fully loaded, fluid is redirected through the second element. The loaded element can be changed without an interruption in flow. In the center position, the valve allows the oil to flow through both filters.

FILTER CLASSIFICATIONS

Low Pressure Filter*: Filter pressure range from 0 to 500 psi. Mostly applied in return line filtration where system pressure is at a low point.

Medium Pressure Filter*: Filter pressure range from 500 to 1500 psi. Often used in hydrostatic charge pressure applications.

High Pressure Filter*: Filter pressure range is 1500 psi and above. Mostly applied on the pressure side of the system where pressure is highest.

High Pressure Hydrostatic Filter: Used in high pressure hydrostatic closed loop systems. Allows for reverse flow through the system.

Bypass vs. Non-Bypass: The pressure rises as an element becomes loaded with contaminants. Standard filters are equipped with a bypass valve that redirects hydraulic fluid when the pressure drop reaches a predetermined level, so the element does not lose its structural integrity. The filter element is bypassed and fluid continues on through the system.

In non-bypass filters bypass is not optional. They are used to protect expensive components that are more sensitive to contaminants, and cannot be exposed to unfiltered fluid. The element is exposed to higher pressures, as there is no bypass. For that reason this type of filter requires a high crush element to guarantee its structural integrity.

Air Breather: Filters air that is drawn into a reservoir when the fluid level changes.

Desiccant Air Breather: In addition to filtering out particle contaminants, this breather also removes water vapor.

Schroeder Industries LLC wishes to thank both the National Fluid Power Association and Penton Publishing for the use of certain generic terms shown in this glossary. Excerpts taken from ANSI B93.2-1986/NFPA T3.10.3. 1967(R1980) and Penton Publishing's *Fluid Power Handbook & Directory (2006-2007)*.

*These ranges have been determined to provide a quick reference for the purpose of creating our catalog. This is currently no industry standard terminology. These ranges are subject to change.