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Active Voltage Conditioners
7.14 PCS100 AVC-40

Industries in developed countries, with modern power networks, are not immune to voltage problems. Although utilities endeavor to supply reliable, high-quality power, voltage sags and surges will continue to be a fact of life.

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01 PCS100 AVC-40
Single line diagram

The PCS100 AVC-40 is an active voltage conditioner. It is a high performance power electronic system designed for industrial and large commercial applications. It responds instantly to power quality events, providing continuous regulation of voltage.

With high power capacity, the PCS100 AVC-40 is the perfect solution for industrial loads using significant power as well as large commercial buildings where continuity of service is paramount. The PCS100 AVC-40 is designed to target voltage sag events while also providing protection against swells. Sag events are the major cause of lost production.

Key benefits
Reduce the cost of sag events
The PCS100 AVC-40 closes the electrical compatibility gap between the supply and plant by protecting the load from utility induced voltage sag events. The PCS100 AVC-40 minimizes the undue stress to the expensive equipment, thus increasing the equipment lifetime.

Improve plant operation
The PCS100 AVC-40 regulates the voltage, removing long term undervoltage, overvoltage and voltage imbalance to reduce waste and damage to the expensive equipment. It also removes voltage fluctuations, which can cause process variation, improving the quality of operation of the plant or the facility.
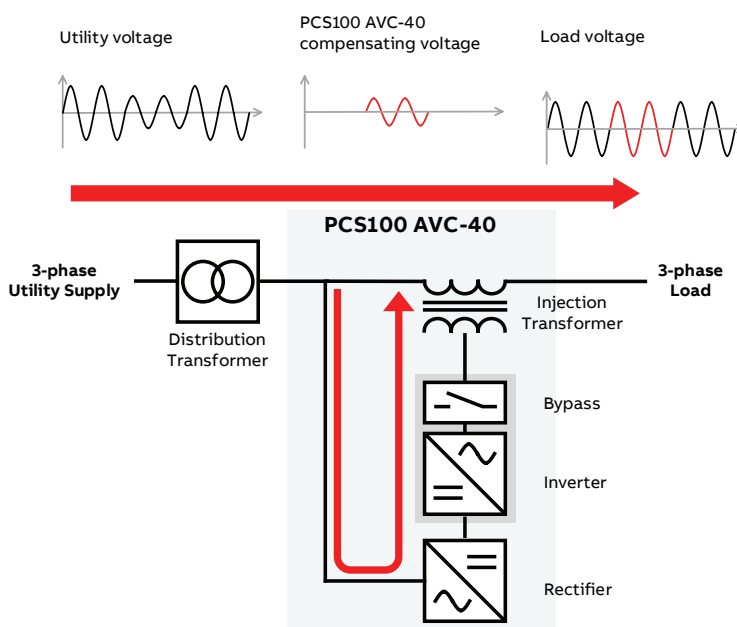
Faster return on investment
With industry leading efficiency exceeding 98 percent the PCS100 AVC-40 requires minimal costs for electricity and cooling. With no energy storage the ongoing maintenance cost is minimized, resulting in low total cost of ownership.

Reduce damage to equipment
The PCS100 AVC-40 protects expensive equipment by regulating the voltage to remove long term undervoltage, overvoltage and voltage imbalances.

Key features
• No energy storage
  - Increased system reliability with minimized maintenance
• Very high efficiency
• Continuous online regulation
• Industrial design
• Small footprint
  - Industry leading power density
• Regenerative load support
• Internal bypass
  - Redundant internal bypass design
• Connectivity
  - Ethernet
  - Modbus TCP
  - Integrated web server
  - E-mail notifications
• Multilingual graphical touch screen interface

7

Utility voltage   PCS100 AVC-40 compensating voltage   Load voltage

PCS100 AVC-40

3-phase Utility Supply   **3-phase Load**

Distribution Transformer

Injection Transformer

Bypass

Inverter

Rectifier

Static Frequency Converter
7.15 PCS100 SFC - 125 kVA to 10 MVA

PCS100 Static Frequency Converters are commonly used to interconnect 50 Hz and 60 Hz systems.

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01 PCS100 SFC diagram

ABB's PCS100 Static Frequency Converter allows the interconnection of grid systems with varying frequencies, offering the ideal solution for shore to ship, plant relocation and testing facility applications.

User benefits
– Minimize operating and maintenance costs
– High reliability provides maximum power availability
– Keeps equipment running through utility voltage sags and frequency variation
– N+1 modular redundancy for mission critical applications
– Lowest total cost of ownership
– Minimal spares required
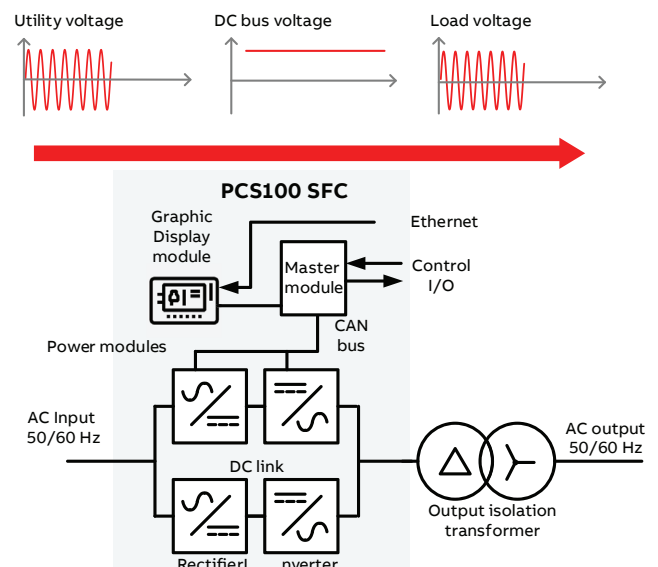– Easy paralleling to other voltage sources using droop

Key product features
– High efficiency power conversion
– Clean sinewave output voltage
– Unity power factor, sinewave, active rectifier design
– Built-in module redundancy without interruption of operation
– Fully isolated AC connection using an output transformer
– Wide range of voltages available; 50 Hz and 60 Hz
– Small footprint design
– Touch screen colour graphic display (GDM)
– Internal web server and Modbus TCP allows remote monitoring
– Output cable voltage drop compensation
– Seamless generator change over standard (synchronization)
– Generator emulation and load sharing
– Power flow control
– Extensive remote control with extend I/O card

How it works
The system is constructed of multiple power electronic modules and functions by converting the input AC power through a sine-wave rectifier to a DC link, and then through an AC sine-wave inverter to produce a clean, full sine-wave output at the new frequency and voltage.

The PCS100 SFC is extremely flexible in terms of paralleling with other voltage sources, either generators or multiple SFC units. Parallel load sharing is achieved using frequency and voltage droop profiles programmed into the converter. This allows the converters to share power with other systems without the need for any additional communication signals.

Starting the SFC into the live bus is greatly simplified due to the automatic output synchronization feature. This enables a full seamless transfer from generator supply to SFC supply on the output bus. If the output bus is dead when the SFC is given a start command it will ramp up the voltage over one second, providing a soft energizing of the output.

Utility voltage   DC bus voltage   Load voltage

PCS100 SFC

Graphic Display module

Ethernet

Master module

Control I/O

CAN bus

Power modules

AC Input 50/60 Hz

DC link

AC output 50/60 Hz

Output isolation transformer

Rectifierl   nverter

Pilot Devices

Compact Pilot Devices

Modular Pilot Devices

8

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Pilot Devices
8.1 Compact Range

CP1-10R-10

CP1-10G-10

CP1-10Y-10

CP1-10L-10

CP1-10W-10

CP1-10B-10

Non-illuminated pushbuttons

Color	Contacts	Bezel	Type	Order code
Momentary fush pushbutton				
Red	1 NO	Black plastic	CP1-10R-10	1SFA619100R1011
Red	1 NC	Black plastic	CP1-10R-01	1SFA619100R1041
Red	1 NC	Chrome metal	CP1-30R-01	1SFA619100R3041
Red	1 NO +1 NC	Black plastic	CP1-10R-11	1SFA619100R1071
Green	1 NO	Black plastic	CP1-10G-10	1SFA619100R1012
Green	1 NO	Chrome metal	CP1-30G-10	1SFA619100R3012
Green	2 NO	Black plastic	CP1-10G-20	1SFA619100R1022
Green	1 NO +1 NC	Black plastic	CP1-10G-11	1SFA619100R1072
Yeow	1 NO	Black plastic	CP1-10Y-10	1SFA619100R1013
Yellow	1 NO +1 NC	Black plastic	CP1-10Y-11	1SFA619100R1073
Blue	1 NO	Black plastic	CP1-10L-10	1SFA619100R1014
White	1 NO	Black plastic	CP1-10W-10	1SFA619100R1015
Black	1 NO	Black plastic	CP1-10B-10	1SFA619100R1016
Black	2 NO	Black plastic	CP1-10B-20	1SFA619100R1026
Black	1 NO +1 NC	Black plastic	CP1-10B-11	1SFA619100R1076

CP1-11R-10

CP1-11G-10

Illuminated pushbuttons

Color	Contacts	Bezel	Type	Order code
Flush momentary pushbuttonon				
Rated voltage 24 V AC/DC				
Red	1 NO	Black plastic	CP1-11R-10	1SFA619100R1111
Red	1 NC	Black plastic	CP1-11R-01	1SFA619100R1141
Green	1 NO	Black plastic	CP1-11G-10	1SFA619100R1112
Rated voltage 110-130 V AC/DC				
Red	1 NO	Black plastic	CP1-12R-10	1SFA619100R1211
Red	1 NC	Black plastic	CP1-12R-01	1SFA619100R1241
Green	1 NO	Black plastic	CP1-12G-10	1SFA619100R1212
Rated voltage 220 V AC/DC				
Red	1 NO	Black plastic	CP1-13R-10	1SFA619100R1311
Red	1 NC	Black plastic	CP1-13R-01	1SFA619100R1341
Green	1 NO	Black plastic	CP1-13G-10	1SFA619100R1312

For more pilot devices products, please contact your ABB local sales organization.

Pilot Devices

8.1 Compact Range

CP6-10R-11

CP6-10G-11

Heavy duty pushbuttons

Color	Contacts	Bezel	Type	Order code
Heavy duty pushbuttons				
Red	1NO + 1NC		CP6-10R-11	1SFA619105R1071
Green	1NO + 1NC		CP6-10G-11	1SFA619105R1072
Black	1NO + 1NC		CP6-10B-11	1SFA619105R1076

CE3T-10R-01

CE4T-10R-01

CE4P-10R-02

CE4K1-10R-02

Non-illuminated emergency stop pushbuttons

Description	Type	Order code
Twist release - Ø 30 mm		
1 NC	CE3T-10R-01	1SFA619500R1041
2 NC	CE3T-10R-02	1SFA619500R1051
1 NO + 1 NC	CE3T-10R-11	1SFA619500R1071
Twist release - Ø 40 mm		
1 NC	CE4T-10R-01	1SFA619550R1041
2 NC	CE4T-10R-02	1SFA619550R1051
1 NO + 1 NC	CE4T-10R-11	1SFA619550R1071
Pull release		
2 NC	CE4P-10R-02	1SFA619551R1051
1 NO + 1 NC	CE4P-10R-11	1SFA619551R1071
Key release, ronis 455, key code 71		
2 NC	CE4K1-10R-02	1SFA619552R1051
1 NO + 1 NC	CE4K1-10R-11	1SFA619552R1071

For more pilot devices products, please contact your ABB local sales organization.

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Pilot Devices

8.1 Compact Range

CL2-502R

CL2-502G

CL2-502Y

CL2-502L

CL2-502C

Pilot lights

Color	Rated current mA	Type	Order code
Rated voltage 24 V AC/DC			
Red	16	CL2-502R	1SFA619403R5021
Green	16	CL2-502G	1SFA619403R5022
Yellow	16	CL2-502Y	1SFA619403R5023
Blue	16	CL2-502L	1SFA619403R5024
Clear	16	CL2-502C	1SFA619403R5028
Rated voltage 110-130 V AC			
Red	15-17	CL2-513R	1SFA619403R5131
Green	15-17	CL2-513G	1SFA619403R5132
Yellow	15-17	CL2-513Y	1SFA619403R5133
Rated voltage 110-130 V DC			
Red	8-9	CL2-515R	1SFA619403R5151
Green	8-9	CL2-515G	1SFA619403R5152
Yellow	8-9	CL2-515Y	1SFA619403R5153
Rated voltage 230 V AC			
Red	17	CL2-523R	1SFA619403R5231
Green	17	CL2-523G	1SFA619403R5232
Yellow	17	CL2-523Y	1SFA619403R5233
Blue	17	CL2-523L	1SFA619403R5234
Clear	17	CL2-523C	1SFA619403R5238
Rated voltage 380-415 V AC			
Red	15-17	CL2-524R	1SFA619403R5421
Green	15-17	CL2-524G	1SFA619403R5422
Rated voltage 230 V AC with 60V anti-inductive voltage			
Red	17	CL2-623R	1SFA619403R6231
Green	17	CL2-623G	1SFA619403R6232
Yellow	17	CL2-623Y	1SFA619403R6233

CB1-610R

CB1-620B

Buzzers Illuminated

Color	Rated voltage	Rated current mA	Type	Order code
Lights and sound output - Pulsation				
Red	24 V AC/DC	53	CB1-610R	1SFA619600R6101
Red	110-130 V AC	70	CB1-611R	1SFA619600R6111
Red	110-130 V DC	15	CB1-612R	1SFA619600R6121
Red	230 V AC	70	CB1-613R	1SFA619600R6131
Black	24 V AC/DC	48	CB1-630B	1SFA619600R6306
Black	110-130 V AC	48	CB1-631B	1SFA619600R6316
Black	110-130 V DC	15	CB1-632B	1SFA619600R6326
Black	230 V AC	40	CB1-633B	1SFA619600R6336
Lights and sound output - Continuous				
Black	24 V AC/DC	40	CB1-620B	1SFA619600R6206
Black	110-130 V AC	40	CB1-621B	1SFA619600R6216
Black	110-130 V DC	40	CB1-622B	1SFA619600R6226
Black	230 V AC	40	CB1-623B	1SFA619600R6236

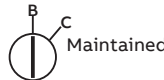For more pilot devices products, please contact your ABB local sales organization.

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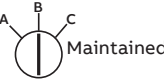
Pilot Devices
8.1 Compact Range

Non-illuminated selector switches

Color	Contacts	Bezel	Type	Order code

2-position, short handle

C2SS1-10B-10

Color	Contacts	Bezel	Type	Order code
B C Maintained	1 NO	Black plastic	C2SS1-10B-10	1SFA619200R1016
	2 NO	Black plastic	C2SS1-10B-20	1SFA619200R1026
	1 NO +1 NC	Black plastic	C2SS1-10B-11	1SFA619200R1076
A C Maintained	1 NO	Black plastic	C2SS2-10B-10	1SFA619201R1016
	2 NO	Black plastic	C2SS2-10B-20	1SFA619201R1026
	1 NO +1 NC	Black plastic	C2SS2-10B-11	1SFA619201R1076

3-position, short handle

C3SS1-30B-20

Color	Contacts	Bezel	Type	Order code
A B C Maintained	2 NO	Black plastic	C3SS1-10B-20	1SFA619210R1026
	2 NO	Chrome metal	C3SS1-30B-20	1SFA619210R3026
	1 NO +1 NC	Black plastic	C3SS1-10B-11	1SFA619210R1076
A B C Momentary	2 NO	Black plastic	C3SS2-10B-20	1SFA619211R1026

Compact range - Accessories

Description	Type	Order code

Protective cover

KA1-8010

Description	Type	Order code
Protective cover	KA1-8010	1SFA616920R8010

Note: For flush pushbutton to prevent accidental operation. Cannot be used together with Legend plate holder.

Bezel - for pushbuttons

Bezel

Description	Type	Order code
Chrome metal	KA1-8021	1SFA616920R8021

Bezel - for selector switchs

Description	Type	Order code
Chrome metal	KA1-8024	1SFA616920R8024

Blanking plug

MA1-81...

Description	Type	Order code
Black	MA1-8130	1SFA611920R8130

Adaptors 30 mm

Description	Type	Order code
Black plastic	KA1-8029	1SFA616920R8029
Metal	KA1-8030	1SFA616920R8030

"Note: For use when fitting the 22 mm pilot devices in 30 mm mounting holes (1.5 - 4 mm panels)
For use with pushbuttons, selector switches, emergency stop pushbutton and pilot lights"

KA1-8029
KA1-8030

Legend plates and holders

Description	Type	Order code
Grey legend plate holder for plastic enclosures	MA6-1060	1SFA611930R1060
Black legend plate holder	KA1-8120	1SFA616920R8120
Legend plate without text or symbol	KA1-8121	1SFA616920R8121
Legend plate for emergency stops for compact enclosures	CA6-1026	1SFA619930R1026

Enclosures

CEPY1-0

Description	Type	Order code
Yellow compact enclosure for emergency stop pushbuttons	CEPY1-0	1SFA619821R1000
Yellow shroud	CA1-8053	1SFA619920R8053
Distance washer		SK615516-1

For more pilot devices products, please contact your ABB local sales organization.

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Pilot Devices

8.2 Modular Range

MP1-10R

MP1-20G

MP1-10Y

MP1-10L

MP1-10W

Non-illuminated pushbuttons

Color	Bezel	Type	Order code
Momentary flush pushbutton			
Red	Black plastic	MP1-10R	1SFA611100R1001
Red	Chrome plastic	MP1-20R	1SFA611100R2001
Red	Chrome metal	MP1-30R	1SFA611100R3001
Green	Black plastic	MP1-10G	1SFA611100R1002
Green	Chrome plastic	MP1-20G	1SFA611100R2002
Green	Chrome metal	MP1-30G	1SFA611100R3002
Yellow	Black plastic	MP1-10Y	1SFA611100R1003
Blue	Black plastic	MP1-10L	1SFA611100R1004
White	Black plastic	MP1-10W	1SFA611100R1005
Black	Black plastic	MP1-10B	1SFA611100R1006
Black	Chrome plastic	MP1-20B	1SFA611100R2006
Black	Chrome metal	MP1-30B	1SFA611100R3006
Clear	Black plastic	MP1-10C	1SFA611100R1008

Maintained flush pushbutton

Color	Bezel	Type	Order code
Red	Black plastic	MP2-10R	1SFA611101R1001

Momentary extended pushbutton

Color	Bezel	Type	Order code
Red	Black plastic	MP3-10R	1SFA611102R1001
Green	Black plastic	MP3-10G	1SFA611102R1002
Black	Black plastic	MP3-10B	1SFA611102R1006
Clear	Black plastic	MP3-10C	1SFA611102R1008

MP3-11R

MP1-11G

MP3-11L

Illuminated pushbuttons

Color	Bezel	Type	Order code
Momentary flush pushbutton			
Red	Black plastic	MP1-11R	1SFA611100R1101
Red	Chrome plastic	MP1-21R	1SFA611100R2101
Red	Chrome metal	MP1-31R	1SFA611100R3101
Green	Black plastic	MP1-11G	1SFA611100R1102
Green	Chrome plastic	MP1-21G	1SFA611100R2102
Green	Chrome metal	MP1-31G	1SFA611100R3102
Yellow	Black plastic	MP1-11Y	1SFA611100R1103
Blue	Black plastic	MP1-11L	1SFA611100R1104
White	Black plastic	MP1-11W	1SFA611100R1105
Clear	Black plastic	MP1-11C	1SFA611100R1108

Maintained flush pushbutton

Color	Bezel	Type	Order code
Red	Black plastic	MP2-11R	1SFA611101R1101
Green	Black plastic	MP2-11G	1SFA611101R1102

Momentary flush pushbutton

Color	Bezel	Type	Order code
Red	Black plastic	MP3-11R	1SFA611102R1101
Green	Black plastic	MP3-11G	1SFA611102R1102
White	Black plastic	MP3-11W	1SFA611102R1105

Pilot Devices
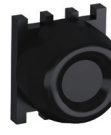
8.2 Modular Range

MPD2-11B

MPD1-11R

MPD13-11G

KP6-40R

KP6-40G

KP6-40B

MPET3-10R

MPET4-10R

MPMT3-11R

Non-illuminated double pushbuttons

Upper button	Lower button	Type	Order code
Flush pushbutton			
Green	Red		
No text	No text	MPD1-11B	1SFA611130R1106
I	O	MPD2-11B	1SFA611131R1106
Extended lower pushbutton			
Green	Red		
I	O	MPD13-11B	1SFA611142R1106
START	STOP	MPD15-11B	1SFA611144R1106

Illuminated double pushbuttons

Upper button	Lower button	Indicator light	Type	Order code
Flush lower pushbutton				
Green	Red			
No text	No text	Red	MPD1-11R	1SFA611130R1101
I	O	Green	MPD2-11G	1SFA611131R1102
I	O	Yellow	MPD2-11Y	1SFA611131R1103
No text	No text	Clear	MPD1-11C	1SFA611130R1108
I	O	Clear	MPD2-11C	1SFA611131R1108
Extended lower pushbutton				
Green	Red			
I	O	Green	MPD13-11G	1SFA611142R1102
START	STOP	Clear	MPD15-11C	1SFA611144R1108

Heavy duty pushbuttons for 30 mm mounting hole

Color	Type	Order code
Heavy duty pushbutton		
Red	KP6-40R	1SFA616105R4001
Green	KP6-40G	1SFA616105R4002
Black	KP6-40B	1SFA616105R4006

Non-illuminated emergency stop pushbuttons

Description	Release method	Type	Order code
Ø 30 mm			
Red	Twist release	MPET3-10R	1SFA611520R1001
Ø 40 mm			
Red	Twist release	MPET4-10R	1SFA611523R1001
Red	Pull release	MPEP4-10R	1SFA611524R1001
Red	Key release code 71/ronis 455	MPEK4-11R	1SFA611525R1101
Ø 60 mm			
Red	Twist release	MPMT4-10R	1SFA611513R1001

Illuminated emergency stop pushbuttons

Description	Release method	Type	Order code
Ø 40 mm			
Red	Twist release	MPMT3-11R	1SFA611510R1101
Ø 60 mm			
Red	Twist release	MPMT4-11R	1SFA611513R1101

8

Pilot Devices

8.2 Modular Range

ML1-100R

ML1-100G

M2SS1-10B

M2SS4-10B

M2SS1-11G

Pilot lights

Description	Type	Order code
Red	ML1-100R	1SFA611400R1001
Green	ML1-100G	1SFA611400R1002
Yellow	ML1-100Y	1SFA611400R1003
Blue	ML1-100L	1SFA611400R1004
White	ML1-100W	1SFA611400R1005
Clear	ML1-100C	1SFA611400R1008

Non-illuminated selector switches

Description	Color	Bezel	Type	Order code
2-position, short handle				
Maintained	Black	Black plastic	M2SS1-10B	1SFA611200R1006
Maintained	Black	Black plastic	M2SS2-10B	1SFA611201R1006
	Black	Chrome plastic	M2SS2-20B	1SFA611201R2006
	Black	Chrome plastic	M2SS2-30B	1SFA611201R3006
3-position, short handle				
Maintained	Black	Black plastic	M3SS1-10B	1SFA611210R1006
	Black	Chrome plastic	M3SS1-20B	1SFA611210R2006
	Black	Chrome metal	M3SS1-30B	1SFA611210R3006
Momentary, spring return from A to B and from C to B	Black	Black plastic	M3SS2-10B	1SFA611211R1006
Momentary, spring return from C to B	Black	Black plastic	M3SS2-10B	1SFA611212R1006
Momentary, spring return from A to B	Black	Black plastic	M3SS7-10B	1SFA611216R1006
4-position, short handle				
Maintained	Black	Black plastic	M4SS1-10B	1SFA611290R4006
2-position, long handle				
Maintained	Black	Black plastic	M2SS4-10B	1SFA611203R1006
Maintained	Black	Black plastic	M2SS5-10B	1SFA611204R1006
3-position, long handle				
Maintained	Black	Black plastic	M3SS4-10B	1SFA611213R1006

Illuminated selector switches

Description	Color	Bezel	Type	Order code
2-position, long handle				
Maintained	Green	Black plastic	M2SS1-11G	1SFA611200R1102
Maintained	Green	Black plastic	M2SS2-11G	1SFA611201R1102
3-position, long handle				
Maintained	Green	Black plastic	M3SS1-11G	1SFA611210R1102