10DDD

Single-Phase Programmable Resettable Sectionalizer (1Ø PRS)

Catalog 10DDD September 2016







Type PRS Programmable Resettable Sectionalizer

The Programmable Resettable Sectionalizer (Type PRS) is a device which has built-in intelligence to discriminate between temporary (transient) and permanent faults on distribution systems. It operates in conjunction with a back-up automatic circuit recloser or a reclosing circuit breaker. It is specifically designed for the protection of single-phase lateral lines. When installed at the beginning of a lateral, it virtually eliminates nuisance outages. Its functional concept and design greatly improve system coordination.

Traditionally, the individual laterals are protected by expulsion-type fused cutouts. The fuses are intended to operate only during a permanent fault on the lateral by carefully coordinating the fuse links with the timecurrent characteristics of the upstream automatic circuit recloser or reclosing circuit breaker. Unfortunately, coordination between fuse links and upstream automatic circuit reclosers is unachievable above a few thousand amperes. Coordination, if achieved on paper, can easily change as the fault current increases due to larger capacity facilities, addition of larger substations or reconductoring. Errors in re-fusing is another way that system coordination can be lost.

A sectionalizer is a protective device which has no timecurrent characteristics. With no fuse curve to intersect recloser time-current characteristics, the coordination range is extended to the maximum interrupting rating of the upstream protective device (Figure 1).

This practical function makes the sectionalizer an ideal device for application on single-phase laterals where available fault currents make coordination unachievable with fuses. Programmable electronic resettable sectionalizers (PRS) provide the utility with an economical and easily retrofittable method of enchancing protection of the distribution system. Additionally, with the programmability of the sectionalizer, the device can be used in virtually any application up to loads of 300A continuous. A programmable electronic resettable sectionalizer installed at the start of a lateral, in place of a fuse, can greatly enhance system coordination service continuity and reliability at reduced costs.



The Type PRS electronic sectionalizer comprises two major components: A standard cutout mounting and an electronic module. The design and construction of the Type PRS are such as to enhance reliability and coordination of the distribution system. The electronic sectionalizer module fits into the standard mounting of a Chance Type C and S&C Type XS cutout. This interchangeability reduces the cost of retrofit installation.









Application

The Type PRS electronic sectionalizer is best suited for use in the following applications:

- Locations where fuse coordination is difficult to achieve
- Areas with insufficient load to justify investments in apparatus such as reclosers
- Remote locations prone to transient faults caused by fauna and/or flora
- SAIDI improvements

Benefits

- Improves system reliability
- Distinguishes between permanent and transient faults to reduce outages
- Programmable parameters: Counts, actuating current, reset time
- One programmable unit to meet all needs per specific voltage class
- Historical data storage for system overview and analysis
- Resettable in the cutout mounting base



Drop-open operation is the same for both types of the PRS electronic sectionalizer: Standard (left) and Loadbreak (right, with Arc Chute interrupter). See following pages for specifications and ordering information.

Operation

The power required for the logic circuit of the Type PRS electronic sectionalizer is obtained from the built-in current transformer. When a fault occurs, which exceeds the minimum actuating current of the sectionalizer, the logic circuit will "power-up" (if line load is <5A) or will immediately begin its counting sequence (if line load is >5A) when the fault remains on the line for at least 1 cycle.. The upstream recloser opens the circuit causing the line current to fall below the "dead line threshold" of 500mA for at least 5 cycles. The logic circuit recognizes this as a "count" and stores this occurrence in its memory for up to two minutes, depending on the reset time the user has programmed into the device and/or the prior line load used to maintain power during that time. Accordingly, the Type PRS merely counts the backup reclose operations.

After a predetermined number of such operations, the Type PRS isolates the circuit by dropping out while the back-up recloser is in the open position during a reclose operation. The recloser is then allowed to close, restoring service to the unfaulted sections of the system. If the fault is temporary and is cleared before the sectionalizer count reaches the predetermined number within the programmed reset time, the sectionalizer remains closed and resets to its original state once the reset time expires.

Trunnion Design

The PRS is equipped with a patent pending trunnion design which enables the sectionalizer to be reset to its initial condition while still in the cutout mounting base. If removal from the cutout mounting base is necessary, the PRS can be manually reset using a wrench.



Push towards cutout to reset







Type PRS Programmable Resettable Electronic Sectionalizer

System Voltage:

The sectionalizer must have a voltage rating equal to or greater than the system voltage.

Continuous Current:

The sectionalizer must have a continuous current rating equal to or greater than the anticipated system load current plus overload.

Where hydraulic reclosers are used, the continuous current rating of the sectionalizer is typically equal to the continuous current rating of the upstream automatic circuit recloser.

Minimum Actuating Current:

The minimum actuating current of sectionalizers should be 80% of the phase minimum trip of the source side single-phase automatic circuit recloser (ACR). Where three-phase reclosers or circuit breakers are used, a user may want to coordinate the sectionalizer's actuating current with the ground trip rating.

Where hydraulic reclosers are used, this is easily accomplished by matching the sectionalizer and the recloser's continuous current ratings. The sectionalizer's minimum actuating current is 160% of its continuous current rating and the hydraulic reclosers' phase pick-up is 200% of its continuous current rating (160/200=.80). (Table A).

Deadline Current Threshold:

The deadline current threshold is the current the PRS unit must see on the line to (1) increment its count, and (2) dropout after the unit has reached its programmed number of counts.

After seeing the actuating current for 1 cycle, the device verifies that the current on the line is below the 500mA programmed deadline current threshold for 80ms (5 cycles) before incrementing its count. This ensures that the PRS is working in tandem with an upstream recloser.

Recloser	Typical Sectionalizer Ratings				
Minimum Trip, Amps	Minimum Actuating Current, Amps ± 10%	Continuous Current, Amps			
30	24	15			
50	40	25			
70	56	35			
100	80	50			
140	112	70			
200	160	100			
280	224	140			
400	320	200			

Table A. Recloser/sectionalizer coordination.

NOTE: In order for the devices to meet the deadline threshold of 500mA it is important to ensure that no backfeed, e.g., capacitor banks, generators, etc. downstream from the sectionalizers is reverse loading the line.

Number of Counts:

The sectionalizer should be set to operate in at least one less count than the backup recloser. Example: a 4-shot recloser would require a maximum of a 3-count sectionalizer downstream (Figure 2, line A).

In case of a 2-fast/2-slow reclose setting, a 2-count sectionalizer may be used to reduce the number of recloser operations (Figure 2, line B).

Where sectionalizers are used in series, the downstream sectionalizer should have one less count than the upstream sectionalizer (Figure 3).



Figure 2. Typical distribution system with Type PRS two- and three-count electronic resettable sectionalizers.



Figure 3. Coordination of sectionalizers in series.





Type PRS Programmable Resettable Electronic Sectionalizer

Technical Specifications

Rated Power Frequency	60 Hz/50 Hz
Rated Voltage (BIL)	15kV (110kV BIL)
	27kV (125kV BIL)
	38kV (150/170kV BIL)
Rated Continuous Current	300 Amps
Minimum Line Current	5 amps
Minimum	Programmable between
Actuating Current	10 A and 480 A
Number of Counts:	Programmable for 1, 2, 3
	or 4 counts
Reset time:	Programmable, 30 seconds
	to 300 seconds
Inrush detection time	Less than 1 cycle
Types of inrush currents	Symmetrical and
	Asymmetrical
Method of Inrush currents	Fourier Analysis (FFT)
Deadline detection:	< 500 mA
	500 mA
	100 msec (± 20 msec)
Short time current withstand,	9600 Ampa Sum
I second:	4000 Amps Sym
	4000 Amps Sym.
3 seconds:	3200 Amps Sym.
Momentary current rating:	12,000 Amps. Asym.
*Current measurement accuracy:	± 5%
Iemperature range:	-40°C to +60°C
Maximum Thermal Rating:	300 A continuous current
Surge current withstand	65KA, per ANSI C37.63
Electromagnetic interference	per ANSI C37.63
Radio frequency interference	per ANSI C37.90.2
USB port	Rated IP68







Note: Ratings are based on testing conducted at 60Hz.

 \ast With 5% accuracy, if the unit is programmed for 50 A actuating current, then the unit will pick-up the count at 52.5 A and above but ignore a count at 47.5 A and below.

For Catalog Number System, see following pages.



Type PRS Programmable Resettable Electronic Sectionalizer



Programming

Programming of the unit has been simplified with the use of Hubbell's programming software package. Simply connect the USB cable provided into the USB port on the bottom of the unit and then into a computer with the provided software. Provide the inputs for the upstream device and the software will provide suggested settings which the user can accept or override.

OM29 F	Device Type PRS	Rescan for Ports	S/N· IJ
ettings Event Log Security	Scratchpad Firmware Upgrac	COM Status : Connec	ted
Programmable Section	alizer Parameters		
Actuating Current :	Amps	i (Between 10-480 Amps)	Read Settings From Sectionalizer
Number of Counts to Drop	≻Out : 1 ▼ (Betw	veen 1-4)	Write Settings To Sectionalizer
Reset Time : Line Frequency:	60 V Hz	(Between 30-300 Sec)	Sectionalizer Settings Calculator
Settings Profile		Settings Last Updated	
Active:			
Load From Fi	le Save To File		HUBBELL

Event Log

The programmable sectionalizer contains onboard memory storage that will record the last 128 events the unit has seen. Users will be able to download the event log via the USB port and have access to the measured fault current, number of counts, and deadline current.

п И29		PRS				Rescan for Ports			S/N: I ^J				
tings E	ventLog	Security Scratchp	ad Firmware L	Jpgrade		COM		Status : 0	Connecter	1			
Event L	event Seq #	Event Type	Maximur Current (Imax) [A]	Minimun Current (Imin) [A]	Ta (> 87.5% * lac)	Tb (< 87.5% * lac)	lac	Deadline met	Count	% of Cap Voltag			0
2	-												ł
3	-												1
4	-												1
5	-					-							1
6	-												ł
7	-												1
8	-												1
9	1												1
10													1
Los	ad Even	t Log		Expo	ort Log	To Excel				Clear E	vent Log		

Page 10DDD-6

Phone: 573-682-5521 Email: hpsliterature@hubbell.com Web: hubbellpowersystems.com



Type PRS Programmable ResettableElectronic SectionalizerSilver-plated
top contact



Note: Position 11, Position 12 are optional and can be left blank if the PRS is not wished to be pre-programmed.





Type PRS Programmable Resettable Electronic Sectionalizer





PORCELAIN Cutout Catalog Number System



To order 38kV, 170kV BIL programmable sectionalizer module only = C74006PPT.

Note: Position 11, Position 12 are optional and can be left blank if the PRS is not wished to be pre-programmed.



200

320

Ρ



Accessories Terminal Connectors

Catalog No.	Description	Wt. (lb./kg.)	Min. Order Qty.
T7001325	Parallel-Groove Clamp, tin-plated bronze for No. 6 solid thru 4/0 ACSR or 250 kcmil stranded	0.33 / 0.15	10
T7001326	Small Eyebolt for No. 8 solid thru 2/0 stranded	0.16/0.07	10
T7001327	Large Eyebolt for No. 6 solid thru 4/0 ACSR or 250 kcmil stranded	0.40/0.14	10
	Mounting Brackets		
C2060283	NEMA Heavy Duty "B" Bracket with 1 ^{1/} ," captive bolt for crossarm mounting	2.84 / 1.29	—
C2060280	Extended Crossarm Bracket (Horizontal section is 2 ⁵ /," longer than NEMA "B" bracket)	3.75 / 1.70	—
C2060299	"D" Pole Mounting Bracket	7.67 / 3.48	—
C2060632	Cutout/Arrester Bracket complete with carriage bolts and backstrap	4.00 / 1.81	_
PSC2060887	"V" Easy-On Bracket for Crossarm Height range: 4%" to 5%,", Crossarm Width range: 2%" to 4"	2.9/ 1.32	

Mounting Bracket Dimensions













NOTES





Phone: 573-682-5521 Email: hpsliterature@hubbell.com Web: hubbellpowersystems.com

Page 10DDD-10



NOTES

NUILS







• 8100 Churchill Avenue • Leeds, Alabama 35094 • (205) 699-0840

NOTICE: For the latest revision of our Catalog and Literature, click here or visit our web site: www.hubbellpowersystems.com

NOTE: Hubbell has a policy of continuous product improvement. Please visit hubbellpowersystems.com to confirm current design specifications. ©Copyright 2015 Hubbell Incorporated

NEVER COMPROMISE[™]



www.hubbellpowersystems.com

SEPTEMBER 2016

Catalog 10DDD