

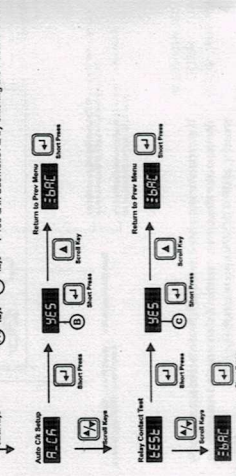
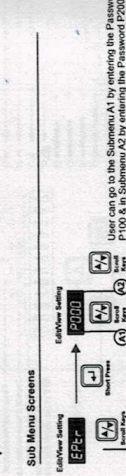
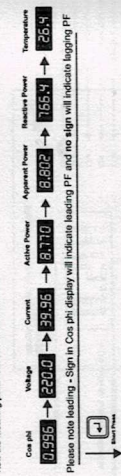
Table-3

Parameters	Display	Setting Range		Step Size	Unit	Default
		Min	Max			
Over Voltage setting <sup>(1)</sup>	dV-U	50	490	1	V	455
Capacitor Bank Trip selection on Over voltage	dE-L	OFF	ON	1	Sec	5
Over current Setting <sup>(1)</sup>	dI-C	50	50	1	In <sup>2</sup>	OFF
Over current Alarm Delay	dE-L	1	599	1	Sec	5
Capacitor Bank Trip selection on Over current	dE-L	OFF	ON	1	Sec	5
Under current Setting <sup>(1)</sup>	uI-C	50	50	1	In <sup>2</sup>	OFF
Under current Alarm delay	dE-L	1	599	1	Sec	5
Capacitor Bank Trip selection on Under current	dE-L	OFF	ON	1	Sec	5
Over compensation <sup>(1)</sup>	dC-o	1	500	1	Sec	5
Under compensation <sup>(1)</sup>	uC-o	1	500	1	Sec	5
Temp High Set <sup>(1)</sup>	t-H	10	20	1	°C	55
Temp Low Set	t-L-o	10	20	1	°C	50
Temp High Alarm Delay	dE-L	1	599	1	Sec	300
Capacitor Bank Trip selection on high Temperature <sup>(1)</sup>	CTP	OFF	ON	1	Sec	5

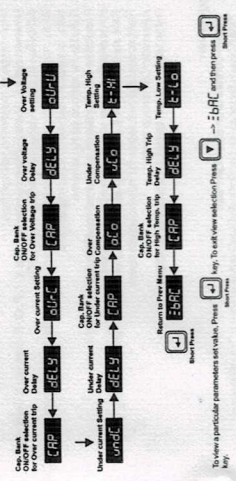
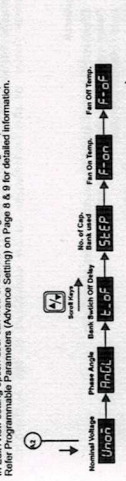
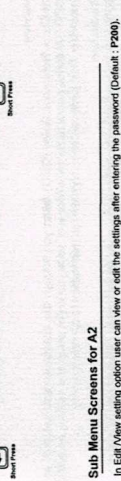
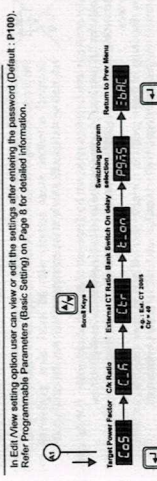
Note : 1. Alarm settings will have disable (OFF) option  
 2. This alarm setting has corresponding capacitor bank trip selection (CAP)  
 If CAP is selected to ON, capacitor bank will be switched OFF on occurrence of that particular fault/ alarm.  
 3. In = Rated Current (RA)

Human Machine Interface (HMI) Screen

AUTO/Manual mode will be indicated by Auto/Manual LED.  
 All parameters will be updated/locked/active through different screens using below the brief overview of the menu structure.

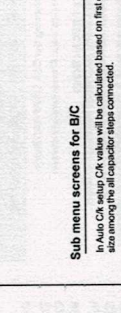


Sub Menu Screens for A1

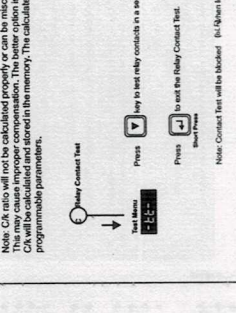


Sub Menu Screens for B/C

In Auto/CT setting, Ck value will be calculated based on first capacitor step setting. This capacitor is the smallest size among the all capacitor steps connected.



Note: Ck ratio will not be calculated properly or can be miscalculated when load is unstable and varies quickly. This may cause improper compensation. The better option is to disconnect the load and vary the Ck ratio. The Ck ratio will be calculated based on the memory. The calculated value can be entered in Ck ratio setting. Under programmable parameters.

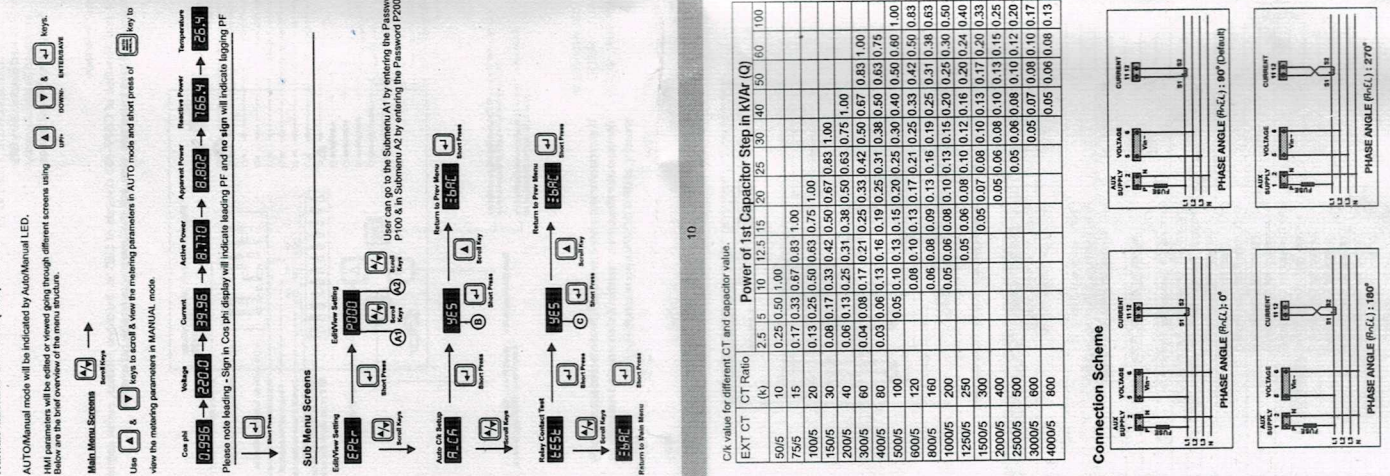


Technical Data

Network Type	3 Phase - 3 Wire / 3 Phase - 4 Wire
Aux-Supply	140 - 265V AC / DC, 50 / 60Hz, 12VA
Sensing/Messurement	True RMS
Operating Voltage	Voltage input : L-N or L-L Range : 50 to 600V AC, 50/60 Hz
Operating Current	40mA - 7.5A ( /5A Current Transformer)
Relay Output Contact	Type : N/O, Rating: 5A @250V AC, 1250VA
Capacitor Steps <sup>(1)</sup>	12 Steps (Max)
Power Consumption	<0.2VA (Current Circuit) <5VA (Voltage Circuit)
Target Cosφ setting	0.80 Lag - 1.00 - 0.8 Lead
CT Ratio	Configurable (Max 9999)
Compliance / Standard	IEC 61000
Operating Temperature Range	0°C to +55°C
Storage Temperature Range	-10°C to +70°C
Humidity Range	5% to 95% non condensing
Installation	Panel mounting & fitted by side screw clamp
Dimension (H x W x D)	(144 x 144 x 80) mm
Packing Weight	900 gms (Approx)

Ck Ratio  
 This setting is a threshold value for switching on/off capacitors steps. It is calculated based on the smallest size capacitor.  
 [Ck = Power Of First Capacitor in kVAR (Q) / Current Transformer Ratio (CT Ratio)]

Connection Scheme

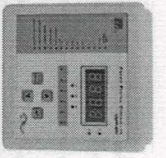


Trouble Shooting Points

Observation	Possible Causes	Action to be taken
Display Not Visible	Either no voltage or wrong voltage is applied, Voltage applied to wrong terminal	1. Verify the Aux supply terminals. 2. Refer the aux supply range in Technical manual
Wrong measurement of voltage	Voltage applied to wrong terminal / Fuse open	1. Check that voltage is connected to designated terminal, not check the fuse in the voltage connection is
Wrong measurement of current	Wrong CT ratio set	1. Check if CT ratio value is as per installed CT. 2. Check if CT is connected to different phase or different CT
Wrong measurement of power factor	CT polarity wrong Phase Angle set as per present wiring	1. Verify the set target cos phi. 2. Set the phase angle as per the connection scheme.
Under Compensation Alarm	All the capacitor steps were switched On. But target cos phi was not achieved	1. Check whether installed rating of capacitor is sufficient for present load and target cos phi. 2. Refer the Ck ratio value in basic setting in page 8.
No capacitor switching through load is inductive	1. In Manual mode Auto/Manual Led will be ON in Manual mode user has to press up/down key to switch to Manual mode. If Manual mode operation is not required switch to Auto mode. 2. Correct if it is loose connection. 3. Check the target cos phi and Ck value set ratio as per selected program selection or not. 4. Verify whether connected capacitor power secondary is connected to any armature installed for present connection. 5. Check that if set phase angle value is correct in setting instruments in current path must be in series.	Change the selection setting to ON Capacitor Bank Trip selection is set to OFF

NOTE

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### CSFP-100 : Power Factor Controller

Quick Reference Guide

(CSFP-100-R06-Z20/CSFP-100-R08-Z20/CSFP-100-R12-Z20 model)

Thank you for purchasing the CAS CSFP-100 Relay

This Guide is for product user & maintenance person

**SAFETY PRECAUTIONS**

Be sure to read the instruction book before use.

Warning : Offending against the message will result in death or serious injury.

#### Caution

- For the safe use of CSFP-100, it is important that people installing or handling it, follow the usual safety procedures as well as specific warnings contained in the QRC.
- Installation, maintenance and inspection of the product should be performed by the qualified staff.
- If the system is not put into service immediately, it must be stored in a dry location at a temperature between -10°C to +70°C.
- On receipt of the device inspect that it has not been damaged during delivery and the model supplied is correct.
- Do not install CSFP-100 near to source of heat and do not expose to a excessively humid atmosphere.
- Please check the phase & polarity while handling the CT wire, Wrong polarity or phase can cause the wrong result (may cause wrong power factor measurement).
- Verify that voltage range for the device supplied matches the machine voltage where it is to be installed.
- Verify correct terminal connection when wiring. Wrong connection may cause damage to the product.
- Check that the secondary windings of external CT is short-circuited when they are not terminated to CT terminals. CSFP-100, An open secondary windings of a loaded CT may cause dangerous over voltage.

#### Warning

- Turn off the all power sources connected to the device, before installing or serviced to prevent electric shocks, injury or damage to persons or property.
- Be sure to read the instruction book before use.
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CAS Electric Limited

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**Disposal**  
The disposal of our products and possible recycling of their components after decommissioning has to be carried out by an accredited recycling company or the products/components must be taken to applicable collection points. Such disposal activities must comply with all local laws, guidelines and environmental specifications of the country in which the disposal is done.  
Our products and batteries must not be disposed of as household waste. For disposing batteries it is necessary to observe the local national/international directives. According to national legislation, penalties may be charged for incorrect disposal of such waste.  
By disposing of these products correctly you will help to save valuable resources and prevent any potential negative effects on human health and the environment.

#### Overview

The Quick Reference Guide (QRG) takes you through the installation and setup of your CSFP-100 series power factor controller and helps you to get setup and running as quickly as possible. This guide contains only the basic information to operate the relay.

**Introduction**  
CSFP-100 Power Factor Controller is designed for Automatic / Manual control of external Capacitor Banks in 3 Phase 4 Wire or 3 Phase 3 Wire LT distribution systems to allow the power factor of the installation to be stabilized to the desired value.

#### Features

- ◆ Effective PF control. Up to 12 capacitor banks controllable
- ◆ Servo segment display for user interface
- ◆ Wide range of programming voltage input
- ◆ Measurement & display of the parameters like V, I, P, Q, S, Cos phi & Temperature
- ◆ Wide range of programmable parameter including CT ratio, target Cos phi value, CR compensation, over voltage, overcurrent current etc.
- ◆ Field accessible fan mode for relay contact check
- ◆ Automatic CRK set-up mode
- ◆ Potential free alarm output on abnormal conditions

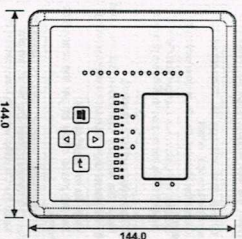
#### Application

- ◆ In all in-comers of an Electrical Plant
- ◆ Fixed power factor correction for individual load (e.g. Motor, Transformer etc.)
- ◆ High-end Software Parks, Buildings and Shopping Malls

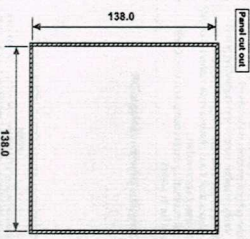
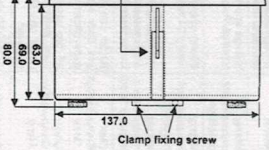
#### Dimension Details

All the dim. are in mm (Gen. Tol. ± 1.0mm)

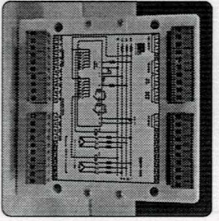
##### Front View



##### Side View



#### Back View of CSFP

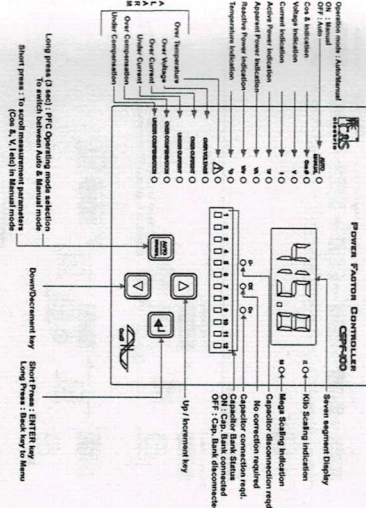


#### Benefits

- ◆ Saving in installation cost of conductors
- ◆ Reduced Electric Utility Bills
- ◆ Increased System Capacity
- ◆ Reduction of Power Losses

#### Front Interface

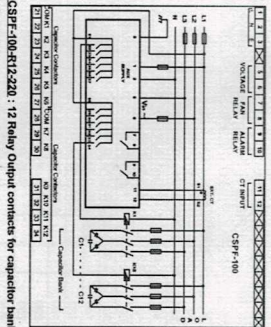
The front interface of CSFP-100 consists of LED for indication / Status, seven segment display and 4 keys to navigate, view, edit and save programmable parameters.



#### Operation Mode

**AUTO MODE** : The capacitor steps are connected / disconnected automatically. The capacitor steps are connected & disconnected manually by pressing of UP & DOWN keys respectively.

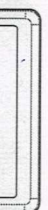
#### Terminal Connections



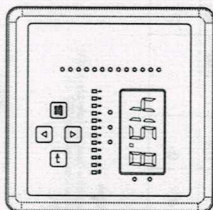
CSFP-100-R12-Z20 : 12 Relay Output contacts for capacitor bank

Term. No.	Connection Name	Connection Description
1	Auto Supply (L)	Phase for control supply
2	Auto Supply (N)	Neutral for control supply
3	Earth	Neutral for control supply
5	V <sub>IN</sub>	Phase Voltage (L3) or (L1)
6	V <sub>IN</sub>	Phase Voltage (L2) or Neutral (N)
7	FAN Output	COM
8	ALARM Output	COM
9	ALARM Output	N/O Contact for ALARM Relay output
10	ALARM Output	COM
11	Ext CT (S1)	External CT Secondary Terminal (N)
12	Ext CT (S2)	External CT Secondary Terminal (Ou)
21	CO <sub>MM</sub>	Common Terminal for Relay contact K1-K6
22	K1	N/O Contact for Cap Bank-1
23	K2	N/O Contact for Cap Bank-2
24	K3	N/O Contact for Cap Bank-3
25	K4	N/O Contact for Cap Bank-4
26	K5	N/O Contact for Cap Bank-5
27	K6	N/O Contact for Cap Bank-6
28	CO <sub>MM</sub>	Common Terminal for Relay contact K7-K12
29	K7	N/O Contact for Cap Bank-7
30	K8	N/O Contact for Cap Bank-8
31	K9	N/O Contact for Cap Bank-9
32	K10	N/O Contact for Cap Bank-10
33	K11	N/O Contact for Cap Bank-11
34	K12	N/O Contact for Cap Bank-12

NOTE: Terminal Nos. not shown are not in use.



6 Steps  
CSFP-100-R06-Z20



12 Steps  
CSFP-100-R12-Z20



8 Steps  
CSFP-100-R08-Z20

#### Programmable Parameters

Parameters	Display	Setting Range	Step Size	Unit	Default
Target Cos φ <sup>(1)</sup>	C.5	0.80 - 0.80	0.01	-	L20
CRK Ratio <sup>(2)</sup>	C.6	0.03 - 0.20	0.01	-	0.07
External CT Ratio	C.7	1 - 9999	1	-	1
Bank switch ON delay	E.on	1 - 9999	1	Sec	5
Switching program selection <sup>(3)</sup>	Pg.5	Pg 1 - Pg 9	-	-	Pg 1

Note : <sup>(1)</sup> Target Cos φ setting 0.80 to -0.80 means 0.80 (lagging) to 0.80 (leading)  
<sup>(2)</sup> Refer CRK Ratio section to set proper value.  
<sup>(3)</sup> Switching program determines the power (kVAh) ratio sequence of the capacitor Bank steps connected.

Parameters	Display	Setting Range	Step Size	Unit	Default
Nominal Voltage <sup>(4)</sup>	U.on	50 - 435	1	V	415
Phase Angle <sup>(5)</sup>	fr.cL	0 - 330	30	Degree	90
Bank switch OFF delay <sup>(6)</sup>	L.off	1 - 9999	1	Sec	10
No. of Capacitor Bank used <sup>(7)</sup>	SEF	1 - 12	1	-	12
Fan ON Temperature	F.on	5 - 100	1	°C	45
Fan OFF Temperature	F.off	5 - 90	1	°C	40

#### Advance Setting (A) Common Parameters

Parameters	Display	Setting Range	Step Size	Unit	Default
Nominal Voltage <sup>(4)</sup>	U.on	50 - 435	1	V	415
Phase Angle <sup>(5)</sup>	fr.cL	0 - 330	30	Degree	90
Bank switch OFF delay <sup>(6)</sup>	L.off	1 - 9999	1	Sec	10
No. of Capacitor Bank used <sup>(7)</sup>	SEF	1 - 12	1	-	12
Fan ON Temperature	F.on	5 - 100	1	°C	45
Fan OFF Temperature	F.off	5 - 90	1	°C	40

Note : <sup>(4)</sup> Phase Angle should be set as per the voltage and current connection shown in connection scheme.  
<sup>(5)</sup> Model Dependent.