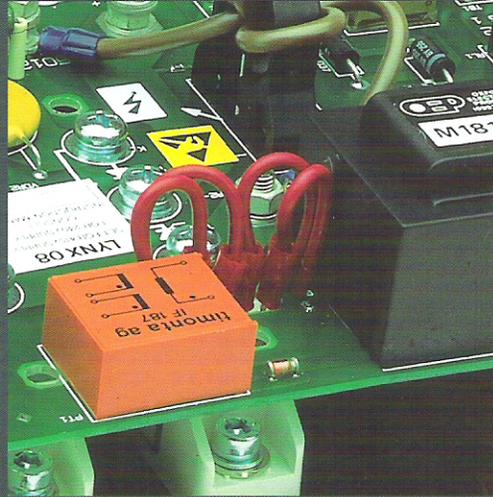


# Control Techniques



## DC Motor Speed Controllers

0.18 to 7.5kW



# Lynx, Puma and Cheetah standard features

## THE SM RANGE

The SM series of DC motor controllers is designed for the efficient speed control of both wound field and permanent magnet DC motors from 0.18 to 7.5kW drive

- Surface Mount Technology
- Dual Input Voltages
- Manufactured in accordance with BS 5750/ISO 9002
- Wound Field/Permanent Magnet Motor Controller
- Speed/Torque Control
- Armature/Tacho Feedback Scaling
- Current Feedback Scaling
- Separately Adjustable Ramps
- 0-10V, 4-20mA Reference
- CSA Approved

## CHEETAH

- Available in Chassis Form and IP40 Enclosure
- 3, 6, 8 and 11A Output Setting

## SPECIFICATION

Electronic motor overload protection 150% FLC for 15 seconds with trip indication

Ambient - 10°C to + 40°C.

Humidity 5-95% RH at 40°C. Non condensing

Altitude: above 1000m derate by 1%/100m to 4000m maximum

2% regulation for 100% load change with AVF (0.5% with tacho feedback)

Full wave bridge - half controlled

20:1 constant torque speed range

## LYNX

Dual input voltage 220/240V or 380/415V  $\pm$  10% 50Hz, 380/440V  $\pm$  10% 60Hz link selectable.

## PUMA

Dual input voltage 220/240V or 110V  $\pm$  10% 50/60Hz link selectable

## CHEETAH

Dual input voltage 110/240V  $\pm$  10% 50/60Hz link selectable

## CONTROL INPUTS

- Set speed
- Run inhibit
- Tacho input
- Set torque

## CONTROL OUTPUTS

Analogue reference - + 10V at 5mA

Speed indication - 0 to + 10V at 5mA

## LYNX

Control Outputs - Fully Isolated

Low speed indication - open collector +24V max./changeover relay contacts

Low speed reference indication - open collector + 24V max./changeover relay contacts

Status/fault indication - open collector +24V max./changeover relay contacts

Load/torque indication - 0 to + 10V at 5mA

Ramp output - 0 to + 10V at 5mA

## PUMA

Low speed indication - open collector + 24V max.

Low speed reference indication - open collector + 24V max.

Status/fault indication - open collector + 24V max.

## CHEETAH

Low speed indication - open collector +24V max./isolated changeover relay contacts

Low speed reference indication - open collector + 24V max./isolated changeover relay contacts

Status/fault indication - open collector + 24V max./isolated changeover relay contacts

## SEPARATELY ADJUSTABLE FEATURES

- Maximum speed
- Minimum speed

- Ramp up
- Ramp down
- IR compensation
- Current limit
- Stability

## SWITCH/LINK SELECTABLE FEATURES

Set speed 0 to 10V/4-20mA

Speed/torque control

Tacho/AVF feedback

Tacho/AVF scaling - four values

Low speed/low speed reference detection

Current feedback scaling - four values

## LYNX

Input supply voltage 220/240V or 380/440V  $\pm$  10%

Fault/low speed relay indication

## PUMA

Input supply voltage 220/240V or 110/120V  $\pm$  10%

## CHEETAH

Input supply voltage 220/240V or 110/120V  $\pm$  10%

Fault/low speed relay indication

## PROTECTION

Fast HRC AC supply input fuse

AC supply filter and transient suppression

Field varistor fitted

Adjustable electronic current limit with timed overload

Instantaneous over current trip

## LYNX

Fused control and field circuits 2A HRC

## CHEETAH

Fused against control earth failure

## DIAGNOSTICS

- Power on
- Overload lxt/peak current
- Standby/reset

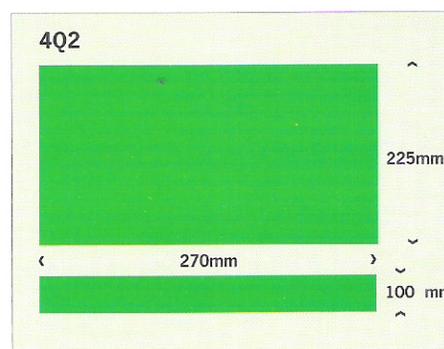
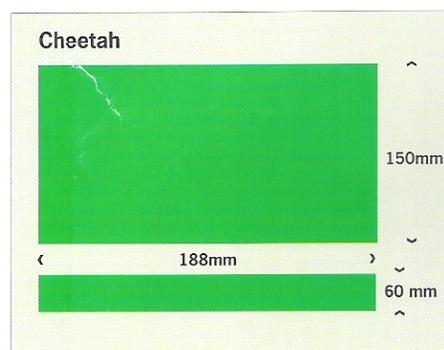
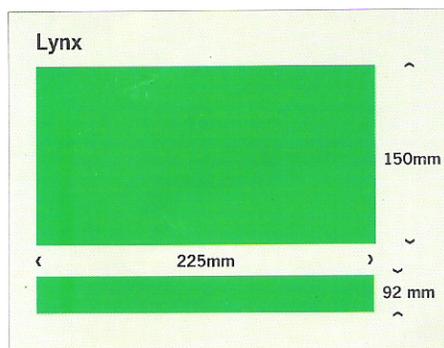
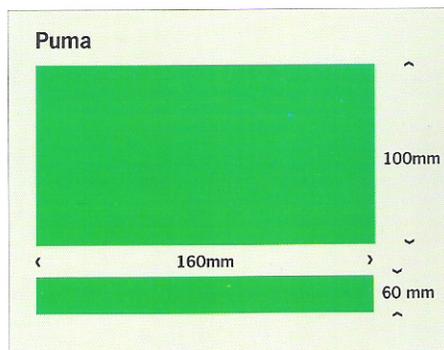
MODEL	Selectable Input Voltage	Maximum Motor kW at		Max. Cont. Output Current A	Armature Voltage		Field Voltage	
		220/240V	380/440V		220/240V	380/440V	220/240V	380/440V
LYNX 8 SM	220/240V or 380/440V $\pm$ 10% 50/60Hz	1.1	2.2	8.0	180	320	190/210	340/370
LYNX 16 SM		2.0	4.0	16	180	320	190/210	340/370
LYNX 30 SM		3.75	7.5	30	180	320	190/210	340/370

MODEL	Selectable Input Voltage	Maximum Motor kW at		Max. Cont. Output Current A	Armature Voltage		Field Voltage	
		110/120V	220/240V		110/120V	220/240V	110/120V	220/240V
PUMA SM	110/120V or 220/240V $\pm$ 10% 50/60Hz	0.18	0.37	3.0	90	180	95	190/210

MODEL	Selectable Input Voltage	Maximum Motor kW at		Max. Cont. Output Current A	Armature Voltage		Field Voltage	
		110/120V	220/240V		110/120V	220/240V	110/120V	220/240V
CHEETAH SM	110/120V or 220/240V $\pm$ 10% 50/60Hz	0.75	1.5	11.0	90	180	95	190/210

# 4Q2 standard features

## Dimensions



- 0.55kW - 7.5kW 4-Quadrant Regenerative thyristor DC control
- From a single phase supply.
- The 4Q2 DC motor speed controller is designed to provide full 4-quadrant control of conventional shunt wound and permanent magnet motors of up to 7.5kW capacity.
- Units are suitable for operation on Line/Neutral supplies with 180 V motors and for Line/Line supplies with 320 V motors.
- Using proven technology and incorporating extensive control and interfacing, the 4Q2 has systems capability for integration into multi-drive schemes.
- Smooth control of speed, torque reversing and braking gives 4Q2 a wide range of applications.

### CONTROL INPUTS

#### Speed Reference

10K ohm Potentiometer  $0/\pm 10v$

Direct speed reference

Input impedance 30K ohms

Ramp speed reference

Input impedance 30K ohms

Current reference

Input impedance 20K ohms

#### Run/Inhibit

N/O contact closed to run, 0 to + 10V logic level.

#### Torque Control

Two inputs available.

Input impedance: 20K ohms

#### Speed Feedback

Single input terminal linked for either Tachogenerator or Armature voltage feedback. Input impedance fixed for armature voltage feedback, must be matched to the tacho voltage where tachogenerator feedback is required.

### CONTROL OUTPUTS

+10 Volts, 1mA reference supply

- 10 Volts, 1mA reference supply

Ramp generator output

Speed error amplifier output (current demand).

#### Overload Relay

Change over contacts rated for 240V at 10A volt free. Relay energises on power up and de-energises on fault.

#### Low Speed Relay

Change over contacts rated for 240V at 10mA volt free. De-energise at standstill.

### PROTECTION

Individual device suppression components are fitted for each thyristor module together with mains suppression. Adjustable electronic current limit with timed and subcycle overload trip.

### PRINCIPLE OF OPERATION

4Q2 incorporates two fully controlled bridges, back to back, only one being operational at any one time.

It may be used in either armature voltage or tachogenerator feedback modes. Alternative connections can give speed or torque control via load sharing inputs/outputs between master and slave units.

Useful features include sub-cycle and delayed overload protection, with easy reset of the overload relay from an externally wired pushbutton or alternatively, by removal of supply to the unit momentarily. Other features include ramped or non-ramped reference unit, electronic stop/start, first regenerative action and pulse train thyristor firing.

Separate input terminals are provided for the mains and auxiliary supplies, for dual voltage operation and allowing the status relay to energise whilst the power circuits remain isolated. The 4Q2 is supplied as a chassis module, IP00.

## Rating Table

Model	Max Rating kW		Max armature amps	Armature volts	Field volts	Field amps (max)
	240v	415v				
4Q2/12	1.50	2.70	12.0	180/320	200/360	1.0
4Q2/30	4.50	7.50	30.0	180/320	200/360	1.0