Nidec
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Step By Step Guide

COMMANDER S100

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Read the User Guide

Before using this product you must read and understand the safety information within the Commander S100 User Guide at www.controltechniques.com/support

MARSHAL

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Introduction

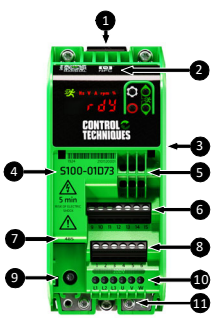
This guide provides step-by-step instructions on how to install the drive, wire the drive using appropriate fuses and cables, configure the drive and run the motor. The Commander S100 is fully compatible with the mobile app, Marshal, which can be found on Google Play store and the App Store. Download the full Commander S100 User Guide at www.controltechniques.com/support.

Important safety information

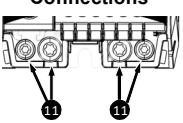
1. **Hazards**
   This Step by Step Guide applies to Commander S100 drives and supplies safety information that must be observed.
2. **Responsibility**
   It is the responsibility of the installer to ensure the safety of the complete system. The manufacturer of the drive accepts no liability for any consequences resulting from inappropriate, negligent, or incorrect design and installation or the failure of the drive.
3. **Compliance with Regulations**
   The installer is responsible for complying with all relevant regulations, such as national wiring regulations.
4. **Enclosure**
   The Basic Drive Module (BDM) is open-type and must be mounted in an enclosure which prevents access except by trained and authorised personnel.
5. **Electrical Hazards**
   The voltages used in the drive can cause severe electrical shock and/or burns and could be lethal. Care is necessary when working with or adjacent to the drive.
6. **System design**
   System design, installation, commissioning, start-up and maintenance must be carried out by personnel with the necessary training and competence who must read all of the safety information and instructions in the User Guide.

When protected by fuses or circuit breakers with maximum ratings as specified in Table 1-4, this product is suitable for use on a circuit capable of delivering not more than 5,000 RMS symmetrical amperes, 480 V maximum (up to the rated voltage of the drive module).

Drive features



Ground (Protective Earth) Connections



1. **DIN Rail Release**
2. **NFC Reader Location**
3. **Rating Information (side of drive)***
4. **Model Number**
5. **Relay Connections**
6. **Digital I/O Connections**
7. **485 Communication Port**
8. **Analog I/O Connections**
9. **EMC Filter Disconnect Screw****
10. **A.C. Supply and Motor Connections**
11. **Ground (Protective Earth) Connections (2 x M4 screws provided)**

***Always check the drive voltage rating is suitable for the installation**

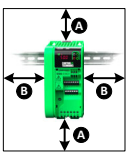
****Read Information in chapter 4.0 Electrical Installation in the User Guide before removal.**

STEP 1: Mount the drive

A drill template for wall mounting is included on the drive packaging for quick installation. No screws are required when mounting the drive onto a DIN rail.

Table 1-1 Drive dimensions

Frame size	Overall Dimensions (±0.5 mm)				Mounting Dimensions (±0.5 mm)				
				Weight					Ø Mounting Hole Diameter
S100-01	**156 mm** 6.14 in	**68 mm** 2.70 in	**130 mm** 5.12 in	**0.7 kg** 1.54 lb	**46 mm** 1.81 in	**145 mm** 5.71 in	**45 mm** 1.77 in	**22.5 mm** 0.89 in	**4.8 mm** 0.19 in
S100-02	**192 mm** 7.56 in	**68 mm** 2.70 in	**132 mm** 5.20 in	**0.8 kg** 1.76 lb	**46 mm** 1.81 in	**180 mm** 7.11 in	**45 mm** 1.77 in	**22.5 mm** 0.89 in	**4.8 mm** 0.19 in
S100-03	**192 mm** 7.56 in	**90 mm** 3.54 in	**132 mm** 5.20 in	**1 kg** 2.2 lb	**46 mm** 1.81 in	**180 mm** 7.11 in	**65 mm** 2.56 in	**37.5 mm** 1.48 in	**4.8 mm** 0.19 in



Drive Clearances	S100-01x13, S100-01x23	All other drives
A	100 mm (3.94 in)	45 mm (1.77 in)
B	0 mm (0 in)	

The drive should be operated in an ambient temperature range of -10 °C to 40 °C (14 °F to 104 °F). For temperatures exceeding this range output current deratings apply. For details on de-rating the drive and other environmental conditions follow the guidance in the Commander S100 User Guide.

STEP 2: Wire the drive

Power Terminals (S100-034xx): 5 mm (3/16 in) flat-blade screwdriver.
Power Terminals (all other models): 3 mm (1/8 in) flat-blade screwdriver.
Control Terminals (all models) : 3 mm (1/8 in) flat-blade screwdriver.

Power connections

Connect the supply and motor connections using the cables and fuses or MCB's in Table 1-4. When using a single-phase supply, the supply should be connected to L1 and L2.

Figure 1-1 Power terminal connection

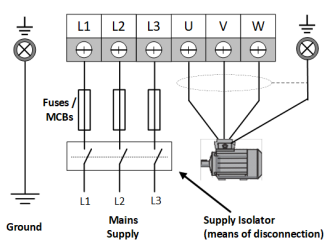


Table 1-2 Recommended Torque Settings

Drive Voltage Rating	100 V	200 V	400 V
Power Connection	0.5 Nm (4.4 lb in)		0.6 Nm (5.3 lb in)
Ground Connections	1.5 Nm (13.3 lb in)		
Control Connections	0.4 Nm (3.5 lb in)		

Always use a screened motor cable with the Commander S100 and connect this screen to the back-plate or the Cable Management Bracket accessory.

Ground connections

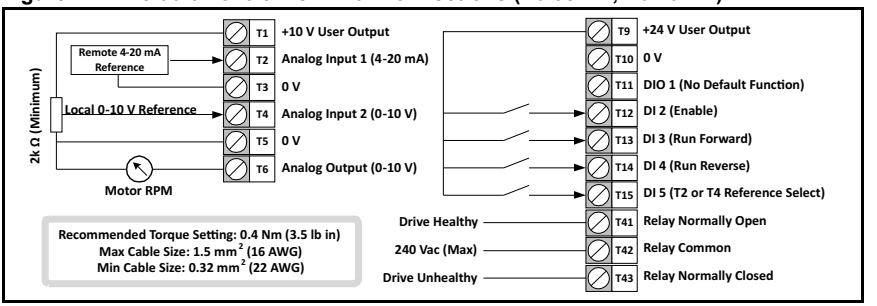
WARNING

Ground conductor should use two copper conductors of the same cross-sectional area as the supply conductors.

To meet UL requirements, UL Listed closed-loop connectors (ring crimps) sized according to the field wiring shall be used for ground connections.

Control connections

Figure 1-2 Default Control Terminal Connections (P0.05 = 1, P0.10 = 1)



The default configuration above uses a remote 4-20 mA on analog input 1 (T2) or a local 0-10 V on analog input 2 (T4) for speed control. Select between these two references using digital input 5 (T15).
For other IO configurations see Drive Configurations in the User Guide or within **Marshal.**

WARNING

The control connections shown above and the 485 port can be PELV rated when connected within a PELV circuit. The terminals are not PELV rated if the relay is connected to a circuit exceeding Overvoltage Category II.

NOTE

Voltage rating of relay cables should be suitable for the maximum expected voltage

Supply Cable, Motor Cable and Fuse/MCB Selection

Table 1-3 Fuse, MCB and Cable Compliance

Standard	IEC	UL
Fuse Class	gG	CC, J or T
MCB	Compliant with EN IEC 60947-2 are recommended, with > 5 kA short circuit breaking capacity. Type C.	The circuit breaker must be UL listed and suitable for the installation environment, rated 600 Vac with a short circuit rating > 5 kA. Type C.
Supply and Motor Cables	All cable sizes are for copper cables. IEC cable sizes assume PVC insulation, installation method B2 and ambient temperature of 40 °C (104 °F).	Cables must be copper and rated for at least 60 °C (140 °F) operation.

The voltage rating of fuses and MCBs must be greater than or equal to the highest supply voltage of the system. Cables must be provided with mechanical protection against damage and be rated for a voltage in excess of the maximum supply voltage.

Table 1-4 Fuse, MCB and Cable Selection

Model Number	Rated Current	Rated Power		Supply Phases	Max Input Current	IEC		UL		Cables for IEC60364-5-52		Cables for UL61800-5-1	
						Fuses	MCB	Fuses	MCB	Supply	Motor	Supply	Motor
	A	kW	hp		A	A		A		mm^2		AWG	
100 V Drives (100 to 120 V ±10 %)													
S100-01113	1.2	0.18	0.25	1	7.2	10	10	10	15	1.5	1.5	24	24
S100-01123	1.4	0.25	0.33	1	8.5	10	10	15	15	1.5	1.5	24	24
S100-01133	2.2	0.37	0.5	1	10.4	12	12	15	15	1.5	1.5	22	22
S100-03113	3.2	0.55	0.75	1	14.8	16	16	20	25	2.5	1.5	20	20
S100-03123	4.2	0.75	1	1	20.0	25	25	30	25	2.5	1.5	18	18
S100-03133	6	1.1	1.5	1	28.5	32	32	40	40	6††	1.5	16	16
200 V Drives (200 to 240 V ±10 %)													
S100-01S13	1.4	0.18	0.25	1	3.3	6	6	6	15	1.5	1.5	24	24
S100-01213	1.4	0.18	0.25	3	2.0	4	6	6	15	1.5	1.5	24	24
S100-02S11	1.2	0.18	0.25	1	3.3	6	6	6	15	1.5	1.5	24	24
S100-01S23	1.6	0.25	0.33	1	3.8	6	6	6	15	1.5	1.5	24	24
S100-01223	1.6	0.25	0.33	3	2.3	4	6	6	15	1.5	1.5	24	24
S100-02S21	1.4	0.25	0.33	1	3.8	6	6	6	15	1.5	1.5	24	24
S100-01S33	2.4	0.37	0.5	1	4.7	6	6	6	15	1.5	1.5	22	22
S100-01233	2.4	0.37	0.5	3	2.8	4	6	6	15	1.5	1.5	22	22
S100-02S31	2.2	0.37	0.5	1	4.7	6	6	6	15	1.5	1.5	22	22
S100-01S43	3.5	0.55	0.75	1	8.0	10	10	10	15	1.5	1.5	20	20
S100-01243	3.5	0.55	0.75	3	4.7	6	6	6	15	1.5	1.5	20	20
S100-02S41	3.2	0.55	0.75	1	8.0	10	10	10	15	1.5	1.5	20	20
S100-01S53	4.6	0.75	1	1	9.5	12	12	15	15	1.5	1.5	18	18
S100-01253	4.6	0.75	1	3	5.7	8	8	10	15	1.5	1.5	18	18
S100-02S51	4.2	0.75	1	1	9.5	12	12	15	15	1.5	1.5	18	18
S100-01D63	6.6	1.1	1.5	1	15.3	16	20	20	20	2.5†	1.5	16	16
				3	12.2	16	16	15	15	1.5	1.5	16	16
S100-02S61	6	1.1	1.5	1	15.3	16	20	20	20	2.5†	1.5	16	16
S100-01D73	7.5	1.5	2	1	18.4	20	25	25	20	2.5†	1.5	16	14
				3	14.3	16	16	20	20	2.5†	1.5	16	14
S100-02S71	6.8	1.5	2	1	18.4	20	25	25	20	2.5†	1.5	16	14
S100-03D13	10.6	2.2	3	1	26.1	32	32	35	30	4	1.5	14	14
				3	19.7	25	25	25	25	4	1.5	14	14
400 V Drives (380 to 480 V ±10 %)													
S100-02413	1.2	0.37	0.5	3	1.9	4	6	6	15	1.5	1.5	24	24
S100-02423	1.7	0.55	0.75	3	2.5	4	6	6	15	1.5	1.5	22	22
S100-02433	2.2	0.75	1	3	3.0	4	6	6	15	1.5	1.5	22	22
S100-02443	3.2	1.1	1.5	3	4.5	6	6	6	15	1.5	1.5	20	20
S100-02453	3.7	1.5	2	3	5.6	8	8	10	15	1.5	1.5	20	20
S100-02463	5.3	2.2	3	3	8.2	10	16	15	15	1.5	1.5	18	18
S100-03413	7.2	3	3	3	13.2	16	16	20	15	2.5	1.5	16	16
S100-03423	8.8	4	5	3	16.0	20	20	25	20	2.5	1.5	14	14

Cables marked † need to be rated for 90 °C and 1.5 mm^2 in order to terminate with a ferrule.

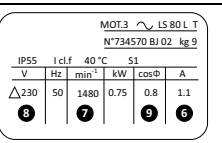
Cables marked †† need to be rated for 90 °C and 4 mm^2 in order to terminate with a ferrule.

Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

STEP 3: Run the motor

It is recommended to use the FastStart option within **Marshal** to configure the drive. Alternatively, the keypad can be used to edit drive parameters directly. For a guide to use the drive keypad, refer to Figure 1-3.

Configure

Action	Detail
Power	Power the drive, ensure the drive is not enabled. (Display shows: inh)
Enter	1. Minimum Frequency Limit P0.01 (Hz) 2. Maximum Frequency Limit P0.02 (Hz) Typically, the maximum frequency limit used is the motor rated frequency. 3. Acceleration Rate 1 P0.03 (s) 4. Deceleration Rate 1 P0.04 (s) These parameters define ramp times between 0 Hz and *Maximum Frequency Limit* P0.02.
Select	5. Frequency Reference Configuration P0.05 This parameter configures the drive speed control. See details within **Marshal** or the **Commander S100 User Guide.**
Enter Motor Nameplate Details	6. Motor Rated Current P0.06 (A) 7. Motor Rated Speed P0.07 (rpm) 8. Motor Rated Voltage P0.08 (V) 9. Motor Rated Power Factor P0.09 (cosΦ) 
Select	10. Enable/Run Configuration P0.10 This parameter configures how to run the drive. See details within **Marshal** or the **Commander S100 User Guide.**

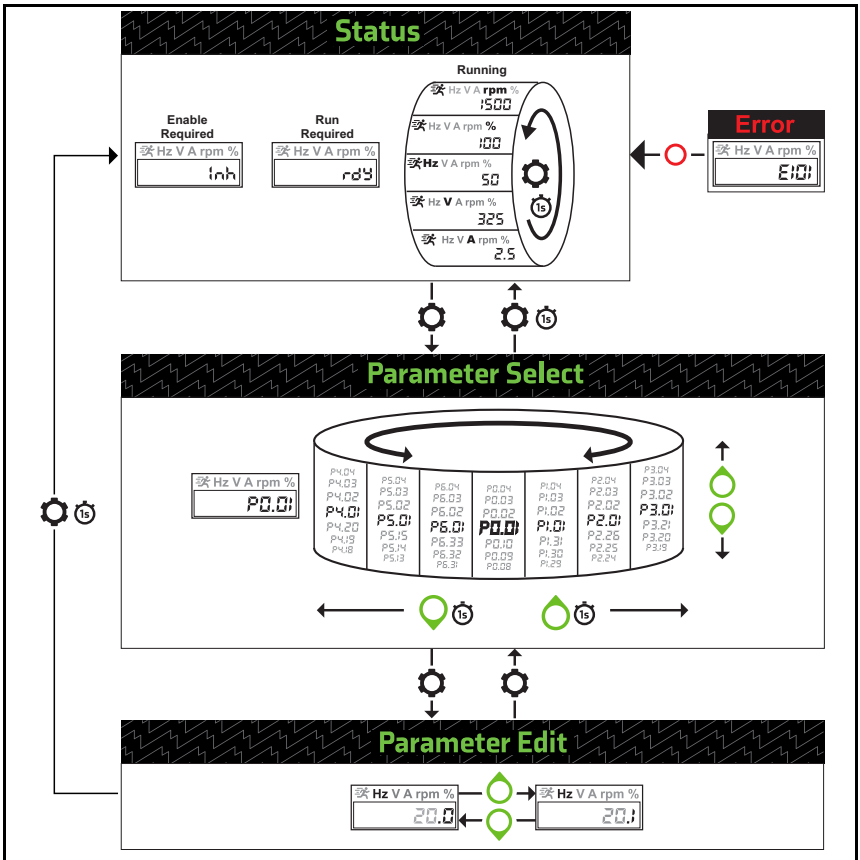
Running and Speed Control (Default Configuration Settings)

Run	**Always ensure it is safe to start the motor before doing so.** Provide an Enable signal to terminal 12 (T12). Provide a run signal to T13 (Run Forward) or T14 (Run Reverse).
Increasing and Decreasing Motor Speed	Increase or decrease current to Analog Input 1 (T2) to increase or decrease the frequency reference. Close Digital Input 5 (T15) to switch to a voltage reference from Analog Input 2 (T4).
Stopping	Remove the Run Forward (T13) or Run Reverse (T14) signal to stop the motor by following the selected deceleration rate. If the Enable signal (T12) is removed while the motor is running, the drive output is immediately disabled, and the motor will coast to a stop.

Troubleshooting

Restore Factory Defaults	1. Ensure the drive is not enabled. (Display shows: inh) 2. Set P4.01 to 1 to load 50 Hz defaults or 2 to load 60 Hz defaults. 3. Press the settings key to exit the parameter.
Troubleshoot	If the drive detects a fault, it will display an error code. All error codes for the drive and possible resolutions are available in the mobile app, **Marshal**. Alternatively, please view the diagnostics section in the **Commander S100 User Guide.**

Figure 1-3 Using the keypad



	Settings Key	Used to navigate through the drive's parameter settings and rotate displayed parameters when the drive is running.
	Stop / Reset Key	Used to reset the drive if there is an error and to stop the drive running if enable/run configuration is set appropriately.
	UP / DOWN Keys	Used individually to increase or decrease editable values shown on the drive display.
	UP & DOWN Keys	When both keys are pressed together, they provide the drive with a latched RUN signal if enable/run configuration is set appropriately.
1s	Press and Hold	On the diagram above this indicates that the key should be pressed and held for 1 second as opposed to a normal short press.

Warning Before using this product you must read and understand the safety information within the User Guide at the URL below.	**Avertissement** Avant d'utiliser ce produit, il est impératif de lire et de bien comprendre les consignes de sécurité du Guide de mise en service, disponible à l'adresse ci-dessous.
Avvertenza Prima di utilizzare questo prodotto leggere e assicurarsi di aver compreso le informazioni sulla sicurezza contenute nella Guida dell'utente consultabile all'URL indicato qui sotto.	**Warnung** Bevor Sie dieses Produkt verwenden, müssen Sie die Sicherheitshinweise in der Betriebsanleitung unter der nachstehenden URL lesen und verstehen.
Advertencia Antes de utilizar este producto, debe leer y comprender la información de seguridad de la Guía del usuario en la siguiente URL.	**Предупреждение** Преди да използвате този продукт, трябва да прочетете и разберете информацията за безопасност в ръководството за потребителя на URL адреса по-долу.
Upozorenje Prije upotrebe ovog proizvoda morate pročitati i razumjeti sigurnosne informacije iz Korisničkog vodiča na donjem URL-u.	**Varování** Před použitím tohoto výrobku si musíte na níže uvedené adrese URL přečíst v návodu k použití bezpečnostní informace a porozumět jim.
Προειδοποίηση Πριν από τη χρήση αυτού του προϊόντος, πρέπει να διαβάσετε και να κατανοήσετε τις πληροφορίες ασφαλείας που περιλαμβάνει ο Οδηγός χρήστη στην παρακάτω διεύθυνση.	**Aviso** Antes de utilizar este produto, deve ler e compreender as informações de segurança contidas no guia do utilizador que pode encontrar no URL abaixo.
Advarsel Før du tager dette produkt i brug, skal du have læst og forstået sikkerhedsoplysningerne i brugervejledningen på webadressen nedenfor.	**Figyelem** A termék használata előtt el kell olvasnia és meg kell értenie a Felhasználói útmutatóban található biztonsági információkat az alábbi URL-címen.
Avertizare Înainte de a utiliza acest produs, trebuie să citiți și să înțelegeți informațiile referitoare la siguranță din Ghidul de utilizare de la adresa URL de mai jos.	**Waarschuwing** Vóór gebruik van dit product moet u de veiligheidsinformatie in de Handleiding op de URL hieronder lezen en begrijpen..
Upozornenie Pred použitím tohto produktu si musíte prečítať a porozumieť všetkým bezpečnostným pokynom uvedeným v Používateľskej príručke, ktorú nájdete na nasledujúcej adrese URL.	**Hoiatus** Enne selle toote kasutamise alustamist peate lugema ja mõistma alltoodud URL-aadressil asuvas kasutusjuhendis toodud ohutusalast teavet.
Brīdinājums Pirms šā produkta lietošanas ir jāizlasa un jāizprot informācija par drošību, kas iekļauta lietošanas pamācībā tālāk norādītajā URL.	**Opozorilo** Pred uporabo tega izdelka morate prebrati in razumeti varnostne informacije v navodilih za uporabo na spodnjem spletnem naslovu.

www.controltechniques.com/support

Varoitus Ennen kuin käytät tätä tuotetta, sinun on luettava ja ymmärrettävä turvallisuusohjeet, jotka sisältyvät alla mainitussa verkko-osoitteessa olevaan käyttöoppaaseen.	**Įspėjimas** Prieš pradėdami naudoti šį gaminį perskaitykite ir įsitikinkite, kad supratote saugos informaciją, pateiktą naudotojo vadove, esančiame toliau nurodytu universaliu adresu.
Twissija Qabel ma tuża dan il-prodott inti għandek taqra u tifhem l-istruzzjonijiet ta' sikurezza fi ħdan il-Gwida għall-Utent fil-URL t'isfel.	**Varning** Innan du använder denna produkt måste du läsa och förstå säkerhetsinformationen i användarhandboken på nedanstående URL-adress.
Ostrzeżenie Przed przystąpieniem do użytkowania produktu należy przeczytać ze zrozumieniem informacje dotyczące bezpieczeństwa przedstawione w Podręczniku użytkownika dostępnym pod następującym adresem.	

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Company information

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