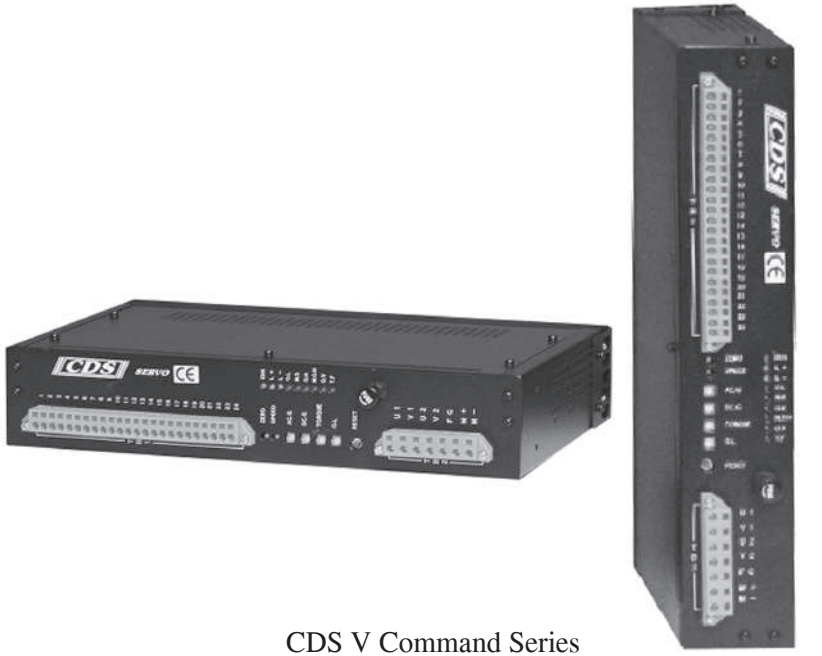
SHIH CHANG Automation Co.,Ltd.

Address:No.28,Dong Fu 1st ST.,Taichung City40148,Taiwan(R.O.C)
Telephone:886-4-22830909
Fax:886-4-22830707
E-mail:cds.servo@msa.hinet.net
http:www.cds-servo.com

DC Servo Motor Driver

Purchase Guide and Operation Instructions



CDS V Command Series

MADE IN TAIWAN

Table of Contents

Note : CDS is SHIH CHANG Automation machinery co., ltd. servo series registered Trade Mark.

Preface

Thanks for purchasing our products.

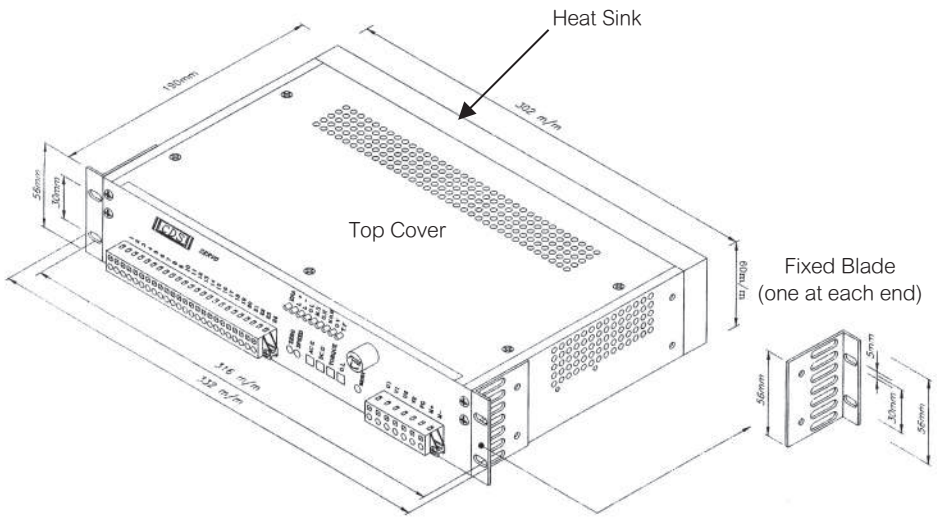
As you may know, the undeliberate driver devices will not only lower the performance of controlling system, but also damage the servo motors. Therefore, we strictly designed the CDS servo driver series. It has high efficient driving device and complete system protection function , thus it can provide excellent performance on driver quality and manipulation safety. As for the problem of brush wear for DC motor, by utilizing the unique protection device, the maintenance and life-span of brush can thus be improved greatly. Compared with other AC brushless servo systems, it has higher endurance, especially in the conditions of low rotation speed, high torque and strict linear motion. The CDS series of servo drivers will be your most reliable and economical choice .

For the various kinds of requirements, the application completeness is the first priority in designing CDS series. Meanwhile, for the consideration of simple installation , we designed three available options C, U and F to meet the requirement of competibity. Please read this instruction manual carefully before purchasing or applying the products.

This instruction manual aims to help customers to have better understanding of our products. If there is any opinions, please feel free to contact with us at any time. Any of your suggestions will be high appreciated.

INSTALLATION

External Dimension



Notices for Installation Environment :

(1) The ambient temperature shall not exceed the limit of 0~50℃.

(2) The relative humidity shall not exceed the limit of 10~90%RH (no dew).

(3) Environment with corrosive and inflammable gases shall be avoided.

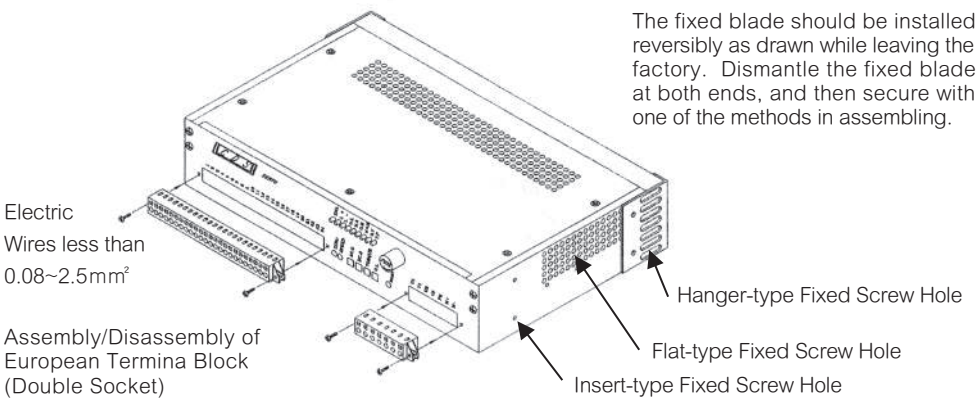
(4) Environment with dust, salt, and ferrous dust shall be avoided.

(5) Environment possible for water, oil and chemical spray shall be avoided.

(6) No big vibration and impaction.

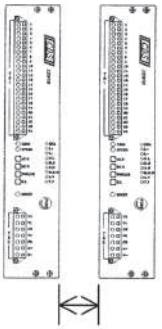
(7) Good ventilation is required.

INSTALLATION



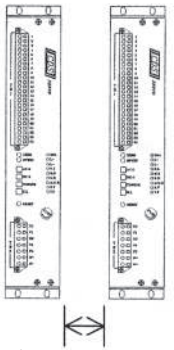
CDS Series is equipped with three securing methods as follows:

(1)Hanger-type



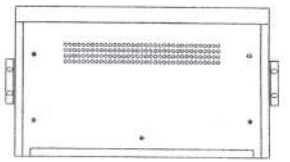
above 15mm
Fixed blade is installed
at the end of heat sink.

(2)Insert-type



above 15mm
Fixed blade is installed at
the end of panel board.

(3) Flat-type



Fixed blade is installed at
the end of bottom

Note : (1) Point fans at the (rear) end of heat sink if they need to be added externally to improve cooling performance.
(2) Improvement in the environment quality shall be considered as well. (For example, entry of dust and water into the box should be avoided.)
(3) All of siqnal cables should be shielded and ground to case.
(4) All of siqnal cables should install ferrite cores.(SPEC:KSA RH16*9*12mm)
(5) DC power cables should also be installed with ferrite core.(SPEC:KSA T25*15*12mm)
(6) Install a power transormer and a commom choke(5.7mH)before AC input.
(7) Note 3-6 are the solutions of EMC effect.

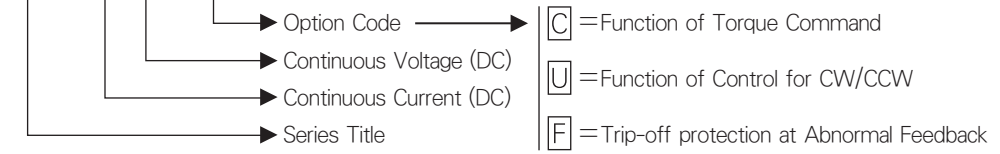
TABLE OF SPECIFICATIONS

MODE / SPEC	CDS 0510	CDS 0515	CDS 0710	CDS 0715	CDS 1010	CDS 1015	CDS 1510	CDS 1515
CONT. CURRENT A RMS	5.5	5.5	7.5	7.5	10	10	15	15
PEAK. CURRENT A PEAK	12	12	16	16	20	20	25	25
CONT. DCV RMS	100	150	100	150	100	150	100	150
MAX DCV PEAK	120	180	120	180	120	180	120	180
NET WEIGHT KGS	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2

Functions of options and specifications (Refer to the instruction of options before selecting)

Type Code :

CDS - 10 15 □□□



Example : CDS－10 15 CUF

Specifications of this driver :

Continuous Current : 10A
(Peak Current : 20A)

Continuous Voltage: 150 VDC
(Maximum Voltage : 180 VDC)

Functions of associated options:

Torque Command C

Control for CW/CCW U

Trip-off Protection at Abnormal Feedback F

NOTES OF SPECIFICATIONS

- Type of Control : PWM effective switching frequency of :
  ※CDS-1510&CDS-1515&CDS-1010&CDS-1015 16KHZ
  ※CDS-0710&CDS-0715&CDS-0510&CDS-0515 20KHZ

- Entry of Speed Command: DC±10V/Rated Speed.

- Voltage Feedback Gradient DC : ※7V/1000 rpm ※9.5V/1000 rpm
  ※13.5V/1000 rpm ※20V/1000 rpm
  (It can be selected by inserting cards in PC board.
  Other custom-made specifications can also be accepted.)

- Variance ratio of rotating speed under 0.1% (variance ratio of load: 0~100%)

- Applicable Power Supply :
  ※Supply to main power (U1.V1) : (Supply of AC40~110V for 150VDC Series)
  : (Supply of AC40~70V for 100VDC Series)
  ※Supply to system (U2.V2) : Within AC110V±15%.

- Standard Protection Device : Overloading, overheated in the driver, overheated in the motor, short-circuit in the motor, regenerative voltage absorption circuit, and alarm .for overvoltage.

- Custom-made requirement for driver over CDS 1515 specifications can be accepted.

- We can offer main power supply 220VAC upon request

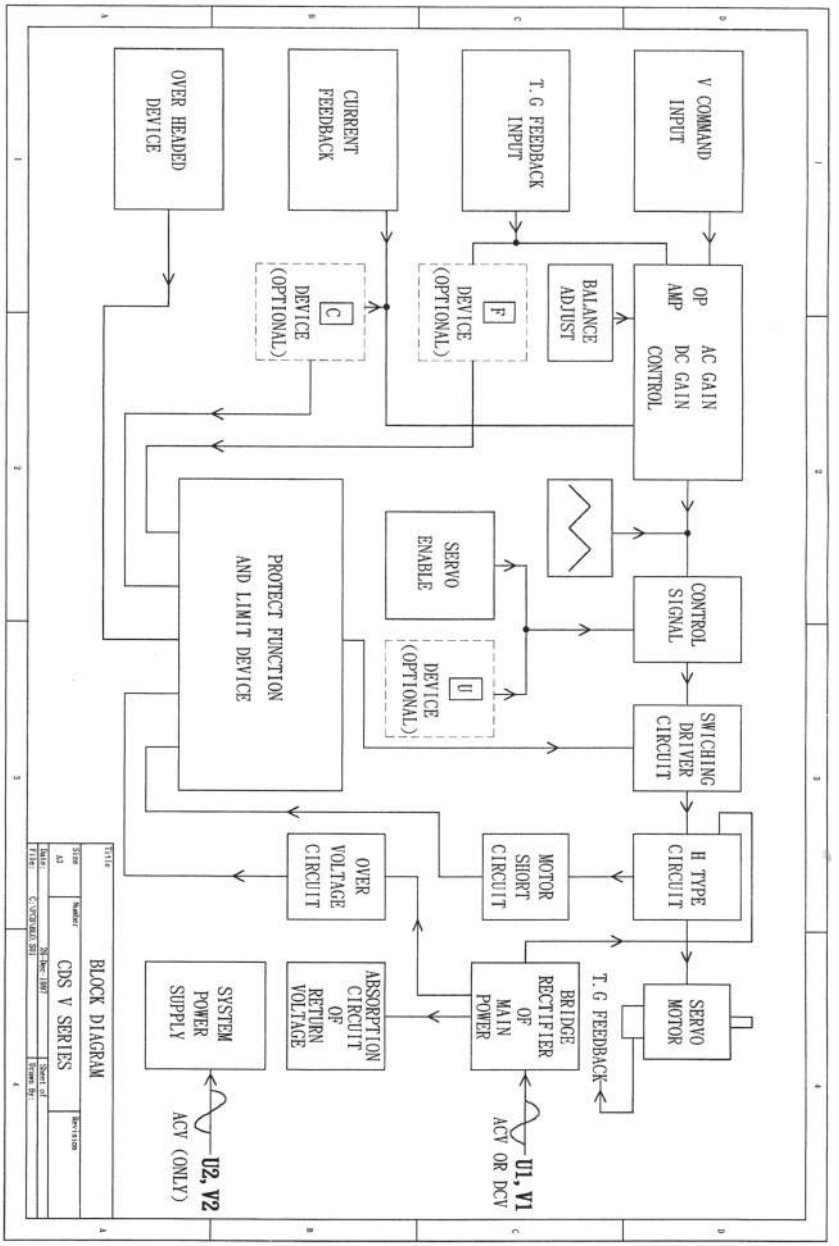
- Suitable for various kind of DC servo motors.

- Option [C] : Control of Torque Command. (Torsion Control)
  (Especially for the link between PC board and master board. Refer to page 31.)

- Option [U] : Control for CW/CCW
  (Especially for the link between PC board and master board. Refer to page 34.)

- Option [F] : Trip-off Protection at abnormal Feedback
  (Especially for the link between PC board and master board. Refer to page 36.)

CDS-V COMMAND SERIES : CIRCUIT BOARD COMPONENTS LAYOUT DIAGRAM


V COMMAND INPUT
T.G FEEDBACK INPUT
CURRENT FEEDBACK
OVER HEADED DEVICE
OP AMP
AC GAIN
DC GAIN
CONTROL
BALANCE ADJUST
F DEVICE (OPTIONAL)
C DEVICE (OPTIONAL)
CONTROL SIGNAL
SERVO ENABLE
U DEVICE (OPTIONAL)
PROTECT FUNCTION AND LIMIT DEVICE
SWICHING DRIVER CIRCUIT
H TYPE CIRCUIT
OVER VOLTAGE CIRCUIT
MOTOR SHORT CIRCUIT
ABSORPTION CIRCUIT OF RETURN VOLTAGE
BRIDGE RECTIFIER OF MAIN POWER
SYSTEM POWER SUPPLY
SERVO MOTOR
T.G FEEDBACK
U1, V1
ACV OR DCV
U2, V2
ACV (ONLY)
BLOCK DIAGRAM
CDS V SERIES

INSTRUCTION OF POWER SUPPLY

Supplying AC power to CDS Series shall be fine since the Series is equipped with Built-in rectifying system. Two sets of power supply terminals are respectively Installed in U1V1 and U2V2 on the panel board of standard driver:supply terminal Of main power in U1V1, while power supply terminal of control system in U2V2.
Other applicable power supply is as follows.

(1) DC 150V Rated Voltage Series.

	Specifications of supply Voltge		Specifications of supply Current
TB2	U1 V1	AC40V~110V 50HZ/60HZ Max. permissible range AC34V~128V	Power should be supplied according To the maximum output current Specified for driver of the same Series.
	U2 V2	AC110V 50HZ/60HZ Max. permissible range AC90V~128V	1A(min)

(2) DC 100VRated Voltage Series.

	Specifications of supply Voltge		Specifications of supply Current
TB2	U1 V1	AC40V~70V 50HZ/60HZ Max. permissible range AC34V~85V	Power should be supplied according To the maximum output current Specified for driver of the same Series.
	U2 V2	AC110V 50HZ/60HZ Max. permissible range AC90V~128V	1A(min)

Note :
Above tablets,U1.V1 can be D.C resource input,however,please pay attention to potential "RIPPLE VOLTAGE" shich could cause over-voltage(ripple voltage is big instantaneously)

Note :

(1) Voltage stabilizer should be installed in environment with great current and voltage variance.

(2) The driver will trip-off if breaking occurs on the main input current and voltage of U1V1 alone (the T.F. LED on the panel board lights up). After the problem is corrected, the power will be supplied through automatic reset. If the power is over AC128V [AC82V for DC100V Series], the driver will trip-off due to overvoltage (the O.V on the panel board lights up). The power supply should be disconnected immediately in case of overvoltage. If the power supply is over AC145V [AC95V for DC100V Series], the rectifying system or power unit may be damaged. In case that the power supply is below or upon critical AC34V, voltage decrease may occur during heavy load. So the motor may not be able to run smoothly owing to the abnormal feedback. (The motor will vibrate with low frequency, make noises, or stop intermittently.) In more serious cases, the situations shall be deem as breaking on U1.V1, leading to the tripping-off of T,F with lit LED. After the problem is corrected, the power will be supplied through automatic reset.

(3) If the power supply for the control system, U2V2, is over AC128V, it may cause damages to internal elements. If the power is below AC90V, the driver can not operate. (If the power supply is about the lower critical limit, unstable enable may occur intermittently).

(4) Generally speaking, power improvement device (e.g.¡Gisolated transformer) should be installed at the front end of main power supply in order to improve the quality of supplied power.

(5) Driver of CDS Series is equipped with quality signal filter and voltage surge absorber. However,proper treatments should also be performed in environment with worse quality of power supply for better performance. For example, the power input terminal should not be for use with other equipment;cables with strong signal interference should avoid from put in same wires duct and should be grounded accurately; or filter and surge absorber should be installed otherwise.

SELECTION AND MATCH OF DRIVER AND MOTOR

There are certain direct relationships between the standard specifications of general servo motor and the matching driver :

(1) Continuous Current (... Amps) and Peak Current (... Amps) of Motor
The selection should be based on the continuous current. The closer the continuous current of driver and that of motor, the better the match. It should be noted that the peak current of motor should not be selected based on that of driver. If the selected specifications of driver are too big, unusual temperature rise and demagnetization, thus damaging the life-span of motor. If necessary, the torque adjustment button on the panel board of driver should be adjusted (refer to the instruction of Adjustment). If the selected specifications of driver is too small, inertia over shout, or even keep overload (the O.L LED lights),occurring easily. Gtenerally inertia over shout can be improved by AC.G adjustment (refer to the instruction of Adjustment).

(2) Continuous Voltage (... VDC) and Peak Voltage (... VDC) of Motor
The continuous output voltage of driver should exceed the continuous voltage of motor or should be close to the peak voltage of motor in order to achieve the best response. However, the "SPEED" adjustment button should be adjusted to the maximum revolving speed, and the output voltage of M+'M- of TB2 should be measured as the reference. The RPM specifications and voltage specifications of ordinary general servo motors should have precisely match (higher accuracy can be measured upon zero load. If the motor is operated at over-speed, the excess speed will result in the unusual expansion of revolution variance and the unusual rise of temperature due to weakening condition, thus damaging the shelf life of the motor.

(3) The motor is equipped with TG inside (refer to Instruction of Speed Feedback). Appropriately select the specifications of driver to match the motor in order to achieve the most efficient and economic performance.

Note : CDS Series is suitable for applications with DC servo motor produced by a variety of manufacturers of Europe, the U.S. and Japan, with outstanding performance. Should any problems occur, please contact our fax hotline for inquiry:
Fax No : 886-4-22117703

SELECTION AND MATCH OF SPEED FEEDBACK VOLTAGE

(If the motor and driver are purchased or ordered from our Company at the same time, the specifications of driver should be specified in advance. Then the driver will be set up as designated or according to the standard specifications of the motor while it is ready to leave the factory, otherwise, T/G gradient will be set at 9.5V/1000rpm as standard).

TACHOGENERATOR (T.G.) can be adopted for the speed feedback of CDS Series. Analog voltage input (F/V) converted from Frequency can also be used.
Four corresponding specifications are frequently adopted for standard product. Four optional sockets are separately placed on the PC board for each suitable return voltage, as follows:

7 V／1000 rpm	13.5 V／1000 rpm
9.5 V／1000 rpm	20V／1000 rpm

If the motor is equipped with TG device internally, the conduit socket on the PC board should be selected based on the TG specifications of motor and should be installed by short-circuit plate. (Other specifications can be made upon request.)

Note:

(1) In case that the specifications of feedback voltage does not correspond to those set up in the driver, the matching of revolution of the motor will be difficult. If necessary,please pay attention to maximum speed of motor, not to run over-speed.

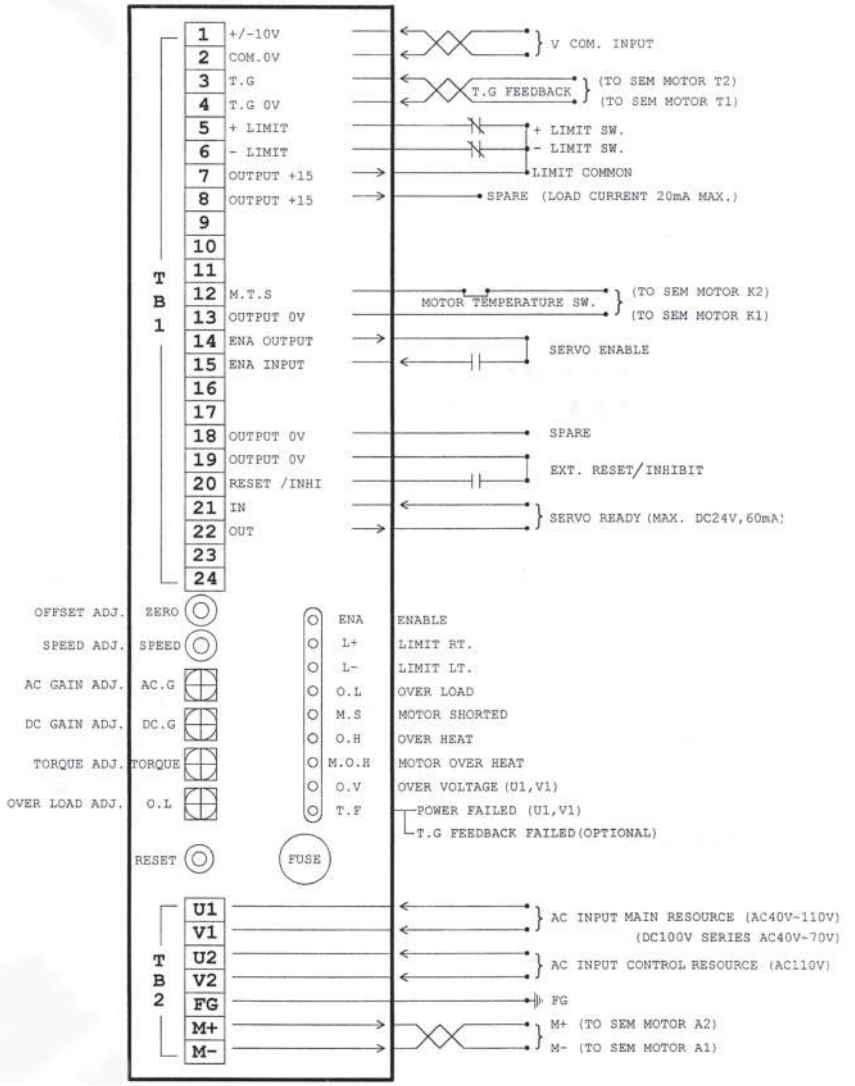
(2) The maximum feedback voltage shall not exceed 100VDC. It will damage the elements inside the feedback system otherwise.
(Example: the specification of TG is 1000rpm=20V; then 5000rpm=100V. Therefore, the TG with such specifications should avoid revolving speed over 500rpm.)

(3) Two or more types of corresponding specifications should not be installed at the same time.

Diagram of JUMPER selected for specifications of feedback voltage,as the P5 page

SIGNAL DESCRIPTION DIAGRAM (STANDARD TYPE)

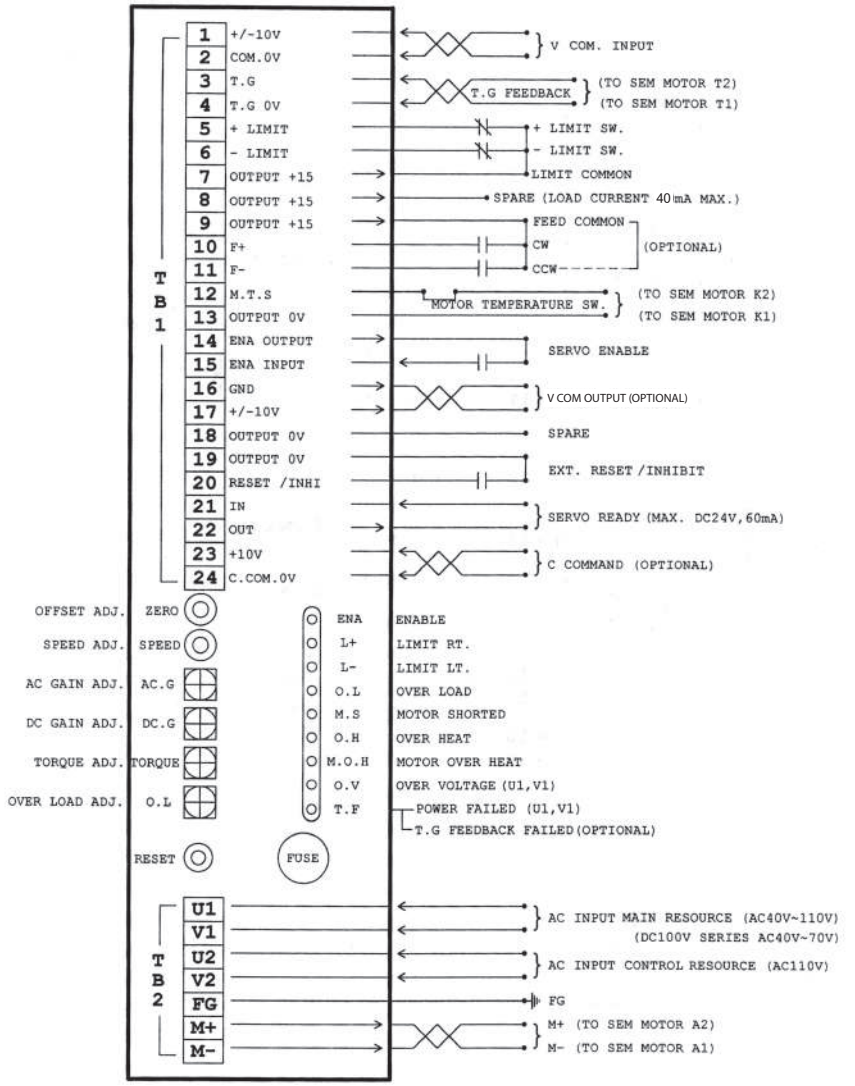
CDS SERVO DRIVER V SERIES
SIGNAL DESCRIPTION



REMARK:UNLESS SPECIFIED,ABOVE FIGURE ALL SIGNALS ARE DCV.

SIGNAL DESCRIPTION DIAGRAM (FULL-EQUIPPED TYPE)

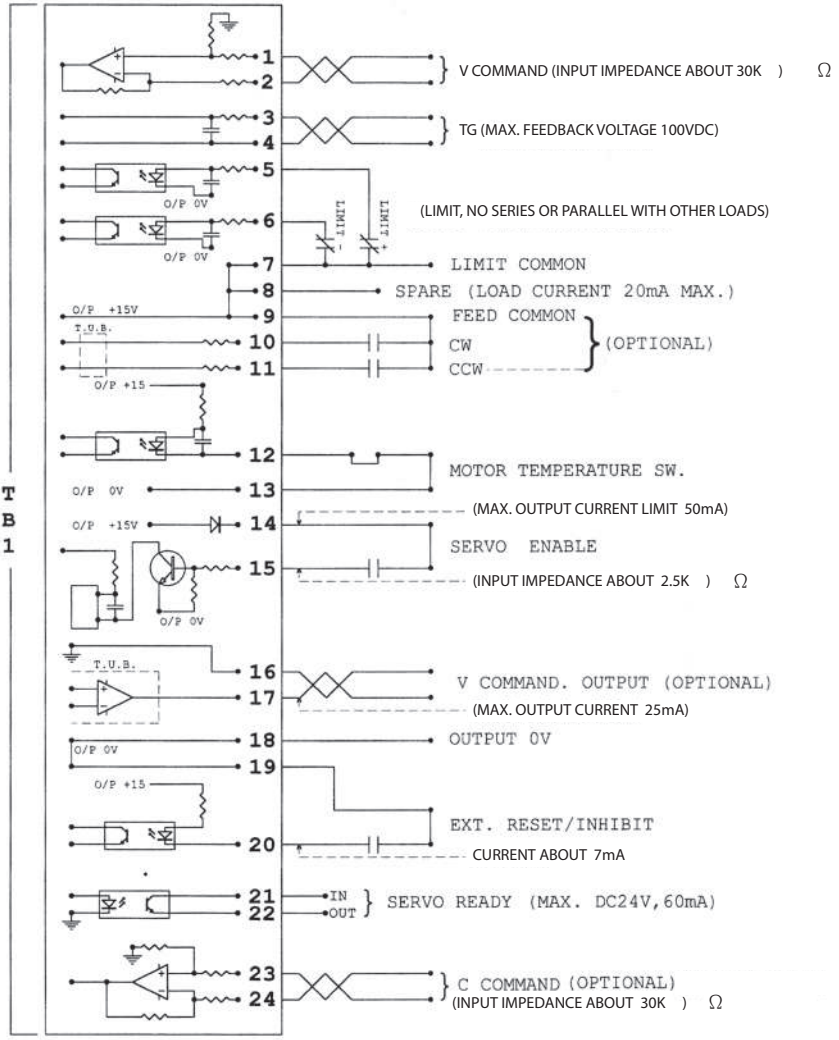
CDS SERVO DRIVER V SERIES
SIGNAL DESCRIPTION



REMARK:UNLESS SPECIFIED,ABOVE FIGURE ALL SIGNALS ARE DCV.

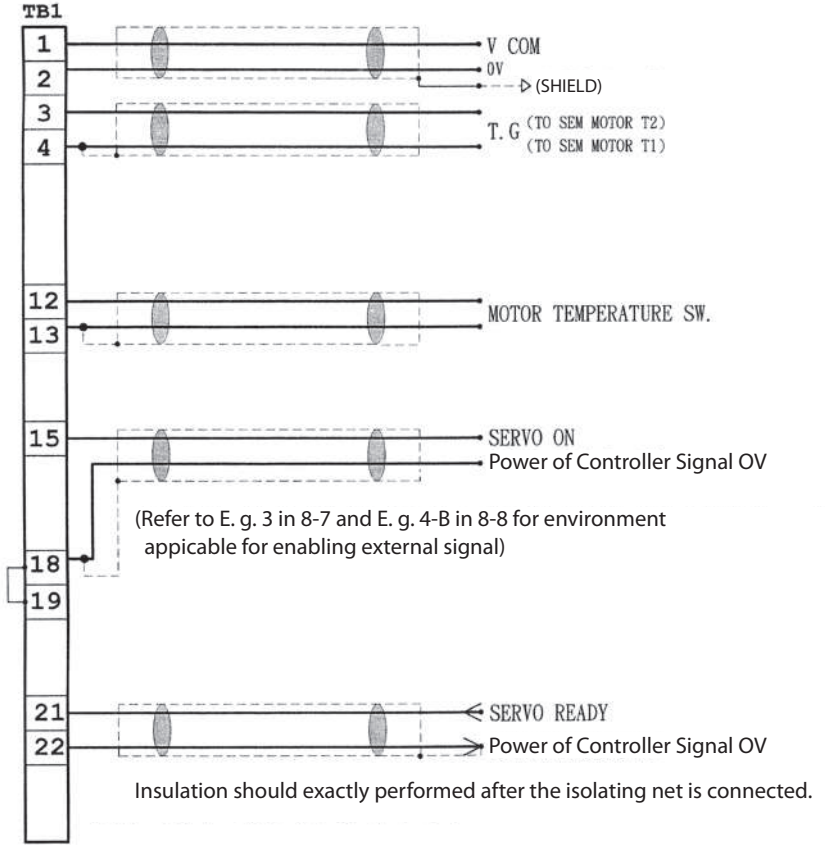
APPENDIX OF SIGNAL DESCRIPTION：
CDS-TB1 1/0 TERMINAL WIRING DIGRAM

CDS SERVO DRIVER V SERIES

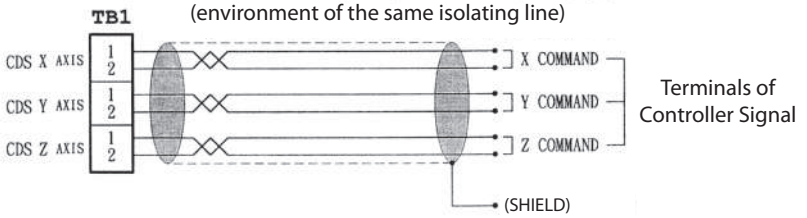


REMARK:UNLESS SPECIFIED,ABOVE FIGURE ALL SIGNALS ARE DCV.

APPENDIX OF SIGNAL DESCRIPTION :
LAYOUT OF ISOLATING NET WIRING



Digram of Multi-axial Wiring
(environment of the same isolating line)



Insulation should be exactly performed after the shield is connected.

APPENDIX: SIGNAL INSTRUCTION PIN NO. 1 AND 2 OF TB1

The input command of speed voltage, DC 10V, makes the set value of "SPEED" adjustment button and the 10V command correspond. Normally it is from the command terminal of controller to the command input terminal of driver (Pin No. 1 and 2 of TB1). The isolating line with isolating net should be adopted to perform direct input through the shortest channel (junction transfer should be avoided). The quality of command voltage should be properly maintained. If interfered by impure signals, the motor would vibrate with high frequency or unusual floating and unstable condition of OFFSET might occur upon HOLDING.

Note：When C-COMMAND function is purchased additionally, V-COMMAND remains the same as above-mentioned if
Please refer to the "Instruction of Torque Command".

APPENDIX: SIGNAL INSTRUCTION PIN NO. 3 AND 4 OF TB1

If the motor is equipped with T'G inside, the isolating line and net should be adopted for the T'G cable to perform direct input to Pin No. 3 and 4 of TB1 through the shortest channel (junction transfer should be avoided). The quality of speed feedback voltage should be properly maintained. If interfered by impure signals, the motor would vibrate or unusual floating condition of OFFSET, or even too weak for HOLDING, might occur. The body of T'G should also be maintained properly. Oil, humidity, or unusual object should also be avoided.

Note：Short-circuit should be prevented between the T'G cable and housing. Otherwise, it may lead to faulty detection of the system or unusual lighting of LED lights on the panel board.

APPENDIX: LIMIT SIGNAL INPUT END PIN NO. 、5、6、7 OF TB1

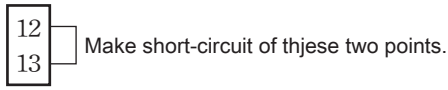
This limit control always in normal close status if this function is not required, please short-circuit these 3 points and insulate them properly.

Note：1. Limit wirings please don't series or parallel with other loads.
2.In the case of disturbance can't be avoided, please make use of relay as transit transfer and put it as close to driver as possible.

WIRING LAYOUT OF M.O.H. SIGNAL INSTRUCTION: (PIN NO. 12 AND 13 OF TB1)

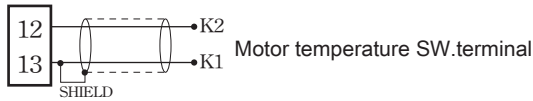
Pin No. 12 and 13 are used as a trip-off protective function if the motor is overheated. They should be kept normal close(N.C.)all the time,so that the motor can operate.
(The following example demonstrates the condition of normal-close (N.C.) temperature switch of the motor)

Example 1:Motor without temperature swich



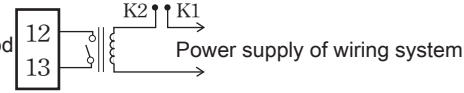
Exampal 2:Motor with temperature swich

A. Direct Method



temperature sw. terminal

B. Relay Transfer Method



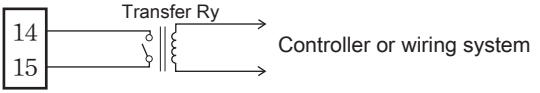
Advantage : The relay can be placed close to the driver to avoid the interference caused by long-distance wiring. ordinary cable will be good enough for the wiring.

WIRING EXAMPLES OF SIGNAL INSTRUCTION OF SERVO ENABLE: (PIN NO. 14 AND 15 OF TB1)

Connecting these two points means"SERVO ON"while disconnecting means"SERVO OFF". (Refer Example 3 and 4-B for enabling through external signal)

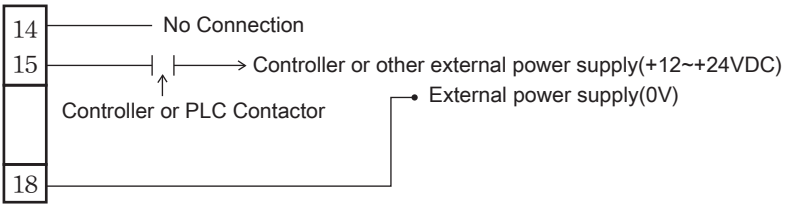
Example 1: Direct Enabling:

Example 2:Enabling Controlled by Relay Transfer:



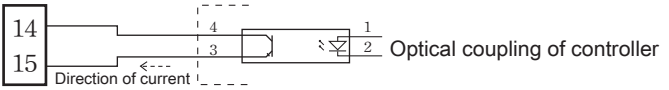
Advantage : The relay can be placed close to the driver to avoid unnecessary Interference caused by wiring.

Example 3:Enabling through External Signal

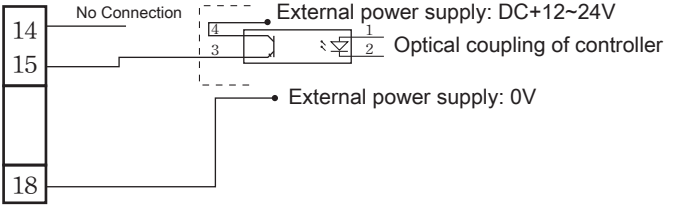


Example 4:Enabling Through Optical Coupling of Controller

A. Using the power supply of the driver



B. Using External power supply

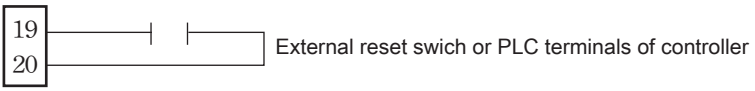


Note : Special attention should be paid to the driving power of optical coupling in order to avoid situations which can not be enabled.
Refer to the following example for the input current needed for pin No. 15
Above 4.5mA while the external power supply is 12VDC.
Above 6mA while the external power supply is 15VDC.
Above 10mA while the external power supply is 24VDC.

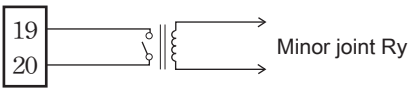
WIRING EXAMPLES OF EXTERNAL RESER/INHIBIT SIGNAL INSTRUCTION: (PIN NO. 19 AND 20 OF TB1)

When pin 19 and 20 are connected, the system will close(inhibit status) and implement the reser function. if there is any problem in the system, make these two points connectfor more than 0.01 second then break and it accomplish the reset operation after the problem is corrected. (The regains the enabling operation at about 0.25 second after the reset operation is completed.)

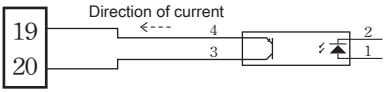
Example 1: Direct Reset /inhibit



Example 2: Relay Transfer Reset /inhibit



Example 3: Reset /inhibit by Optical Coupling of Controller

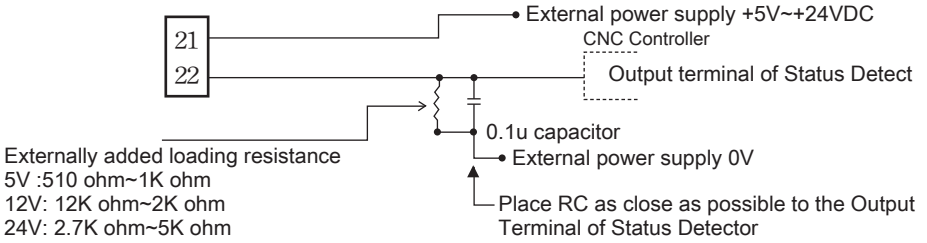


Note : (1) Pay attention to the match of polarity. The input current for Pin No. 19 should Be about 7mA. The driving power of optical coupling should be confirmed to avoid Failure in reset/inhibit.
(2)Extra added *U* occasion, please refer to page P32 (notice 2)

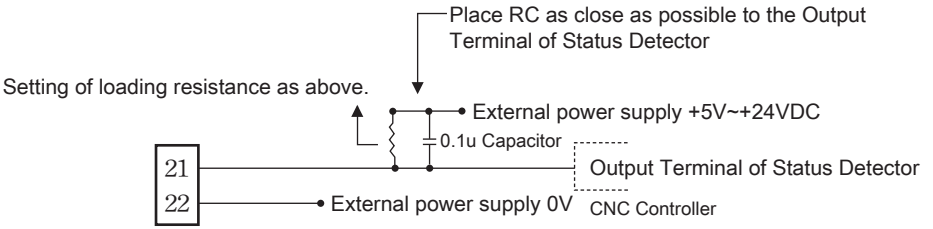
WIRING EXAMPLES OF SIGNAL INSTRUCTION OF SERVO READY: (PIN NO.21 AND 22 OF TB1)

This is a self-diagnosis function of the driver. If the driver trips off or fails, these two points will break for the convenience of control system judgement.
(Pay attention to the direction of current)

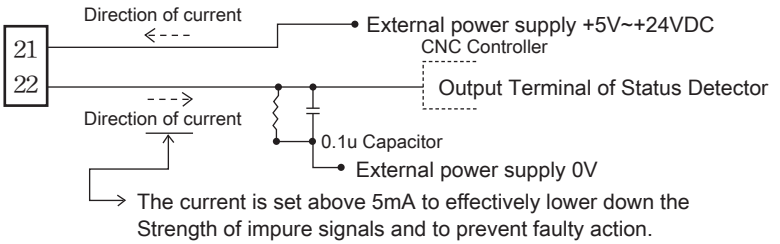
Example 1: Situation judged as "OK" in Status"I"
(HI Electrical potential)



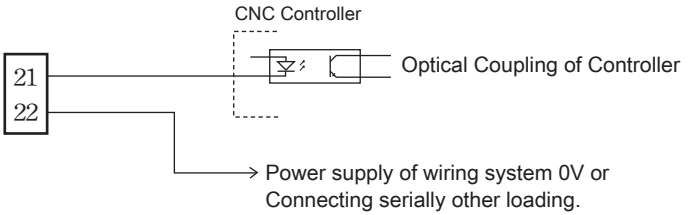
Example 2: Situation judged as "OK" in Status "0":
(L0 Electrical potential)



Note:Exampal 1 and 2

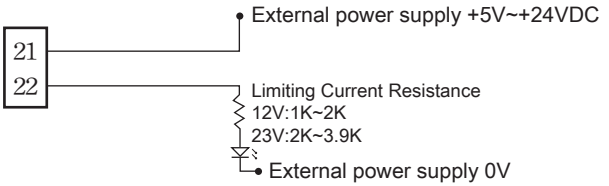


Example 3: Situation for Optical Coupling Motion of Controller:

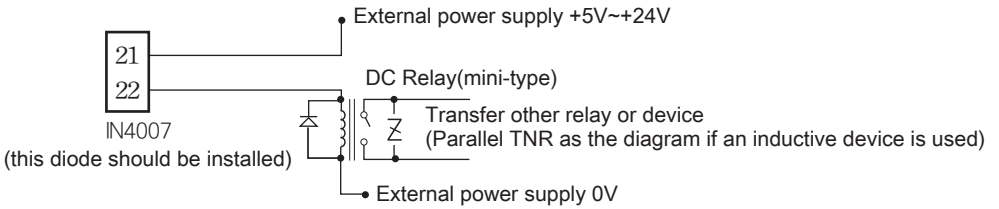


Example 4: Situation for Externally Added Display or Alarm Device:

A. LED Display



B. Lights or Other Alarm Device, through Realy Transfer Method
(DC relay below 24VDC)



Note : The coil current of relay should be confirmed because the input current for pin No. 21 and 22 should not exceed 60mA.
Calculation of coil current of relay:
Continuous current of coil˜Ñ direct current resistance of coil (refer to the stated value or measured by tripli-usage voltmeter)=coil current
E. g: If the continuous current of coil is 24V,direct current resistance of coil Is 500 ohm.
Then the value of coil current should be 24 ÷ 500=0.048(A)=48mA
which means this relay is appropriate.

Protective Functions and Status Instructions (LED Indicator)

(1) ENA Enabling Display (LED on) : enable driver's function.

(2) L+ Positive Limit Display (LED on) : indicate positive rotation limit is achieved,allow reverse rotation only (RESET function is ineffective).

(3) L- Negative Limit Display (LED on) : indicate negative rotation limit is achieved,allow reverse rotation only (RESET function is ineffective).

(4) O.L Overload Display and its Reason (LED on) :
1. Overloading for a long-period of time.
2. Loading exceeds the continuous current.
3. Inappropriate acceleration/deceleration.
4. Overload adjustment is inappropriat (ahead of required value.)

(5) M.S Motor Short-circuit Display(LED on):
1. Motor short-circit
2. Motor cable short-circuit
3. Motor malfunction.
4. Motor brushes were invaded by outside objects (The brush shall be disassembled and cleaned up.)
5. Impural signals are strong, the motor's F.G connections shall be inspected.

(6) O.H Driver Overheated Display(LED on)(RESET function is ineffective):
1. The temperature of operating environments is too high or poor ventilation (add fans to improve ventilation).
2. Overloading for a long-period of time(improper overload position adjustment).
3. Driver doesn't match with the specification of the motor.
4. Regenerative voltage is abnormal (1. Improper acceleration/decel eration or 2. Motor is over-sized.).

Note : 80℃ OVER; below 65℃ will automatically RESET.

(7) M.O.H Motor Overheat Display(LED on) (RESET function is ineffective):
1. Overloading for a long-period of time and poor ventilation
2. Motor doesn't have enough heat dissipation.
3. The selection of motor is improper.

Note: if motor is not equipped with this device, TB1:12.13 shall be short-circuited.
Otherwise, it will be treated as overheat with over mode indicated.

(8) O.V Over-Voltage Display (LED on):

1. Voltage of power supply exceeds the continuous voltage (please refer to power supply instructions).
2. The impural signals of driver power supply are too strong (U1,V1 and U2, V2). Check driver's F.G wire connections.
3. While frequent acceleration/deceleration, the main power supply of U1, V1 is above AC128V (for DC100V series, the specification is AC82V). If in constant speed condition, it shall be tripped off until AC145V.

Note: the trip-off function is to provide alarming only.

(9) T.F Abnormal Speed Feedback Display (LED on):

Trip-off protections of abnormal speed feedback can be classiffollied into the following two categories:

(The trip-off protection at uncontrolled speed is OPTIONAL, the corresponding model code is F.).

1. First category : when the power supply voltages of main power U1, V1 reach lower limits, the trip-off protections will be activated (T.F LED on). The disconnection of main power supply is also included in this protection function. When the fuses of main power on panel board is burn down or have connection problems or the voltage is close to or below AC34V, meanwhile the voltage decreased is occurred during reloading, then motor will vibrate or accompanied with noises and intermittent stops in preliminary stage. If severely, it will treat as U1, V1 short-circuit and cause the trip-out T.F LED light on. After conditions being solved, reset to enabling automatically. (Build-in standard type).

   Note: Main power fuse locates at the panel, if fuse burns once heavy load applied,please check fuse specification. On the other hand, if fuse burns once load applied or Power on, and fuse likely to be seriously burned, it is potentially,the rectifier inside driver is damaged, please send to us for repairement.

2. Second category : trip-off protection at uncontrolled speed with T.F LED light on (the function of OPTIONAL F shall be installed if needed). Whether the function F is equipped or not, please refer to the instruction of trip-off protection on page P35. You can take it as the identification of operational abnormality or, if you're still doubtful of the listing items in the instructions, you can purchase the protective device at any times afterward. And please refer to the F function installation diagram of PC board on page P36 to customize installation by yourself, or to send it back to us to install for you. After problem is solved, don't forget to press RESET button for enabling reset function. .

   Note : Normally, when servo driver enable, T. F. Indicator light on, and motor complete motionless. It apperars and can be judged U. V. Power supply ceased, fuse open, M+. M- wiring mistake or motor out of order. On the other hand, when driver enable,motor runs instantaneously then stop, at this time indicator of T.F. light on. It appears and can be judged, T. G. wiring mistake, T. G. wiring open, T. G wiring shorted or T. G. Malfunction.

Adjustment Instructions (setting knobs on panel board) (please refer to adjustment instructions appendix)

If driver and motor are purchased together from our company, it shall be adjusted according to rated specifications before the delivery.

(1) ZERO Voltage Adjustment (also called Balance Adjustment and OFFSET Adjustment)(18-rotation type of long micro-variable resistor):
When V command is setup to 0, the motor shall be in HOLIDING status. If rotation still occurs, the setting knob shall be adjusted either in clockwise or counterclockwise direction to set motor's speed to be zero.
(If OFFSET floats abnormally, the voltage command and the isolation effect of speed feedback signal shall be inspected or improved.)

(2) SPEED Adjustment (18-rotation type of long micro-variable)
It is internal speed defined adjustments; in other words, speed instructions from the external shall be limited here as maximum speed limit.
Clockwise direction =decelerate rotation speed
Counterclockwise direction = accelerate rotation spee

(3) AC.G Dynamic Respond Adjustment (250° rectangular micro-adjustment Variable resistor)

When the speed of motor comes into stable status (for example: accelerate to constant speed or reduce speed to 0 at the fixed point), owing to different moment of inertia and the resonance frequency of motors, the following situations might occur :

1. When speed changes into stable status, the swinging and rushing phenomena or shaking occur during operation. It is due to motor's dynamic gain being too low. Please adjust AC. G in clockwise direction until the phenomena will not occur again.
2. When speed changes into stable status, but motor has humming sound (The motor and driver will be overheated if the sound continues.). It is due to motor's dynamic gain being too high. Please adjust AC.G in counterclockwise direction until the humming sound stops. But it shall not be over-adjusted or, otherwise when in fixed points, it will be rushing and shaking again.

Clockwise direction = increase gain
Counterclockwise direction = decrease gain
(In order to enhance the dynamic following precision and operation stability, the adjustments of AC.G shall comply with GAIN values.)

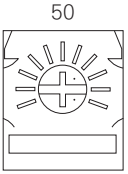
(4) DC.G Adjustment of Servo Response (250° rectangular micro-variable resistor): When delivered from factory, the response was set in the maximum value. If the machine vibrate dramatically during start-up and stop operation, or if the high frequency trembling and overheating occur in un-loaded holding status, the response can be reduced to release the above phenomena. But if the value is adjusted too low, the condition of poor response and weakenholding can be occure. (The signal interference of voltage command and speed feedback signals will often cause high frequency trembling, therefore, the isolation measures shall be properly performed before adjusting response.)
Clockwise direction = increase response
Counterclockwise direction = decrease response
(In order to increase the positioning precision and the stability of motor's HOLDING status, the adjustments of AC.G shall comply with GAIN values.)

(5) TORQUE Motor Torque Adjustment (250° rectangular micro-varable resistor): When delivered from factory, the torque was set in the maximum value. Please setup the necessary maximum current by adjusting torque value according to motor's specification or required functions. When the adjustment is done, the overload positions shall be re-adjusted accordingly. (Please refer to motor specification to obtain the required continuous current for continuous torsion)
Clockwise direction = increase torque
Counterclockwise direction = decrease torque

(6) O.L Overload Positions Adjustment (250° rectangular micro-varable resistor): When delivered from factory, the overload position has been set at its driver's continuous current position. Proper adjustment of overload position can protect driver, motor and the transmitting mechanism.
Clockwise direction = O.L increasing
Counterclockwise direction = O.L decreasing

Appendix of Adjustments Instructions:

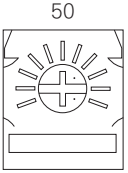
* **AC.G** Dynamic Response Adjustment



If the motor is purchased from our company, it shall be set in optimal condition when delivered from factory.
However, if the motor is purchased through other sources,it will be set in 50% position.

Note: Each model's loading conditions are different, for better soothing motion and higher dynamic following precision, it shall be referred to the previous page of "Dynamic Response Adjustments" for adjustment. (Before adjusting, the proper RPM shall be defined)

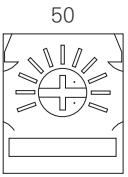
* **DC.G** Servo Response Adjustment



If the motor is purchased from our company, it shall be set in optimal condition when delivered from factory.However, if the motor is purchased through other sources, it will be set in 90% position. (The maximum stiffness)

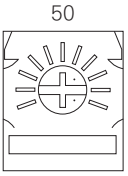
Note: Occassions of friction coefficient is different, for better position precision and motor's stability, it shall be referred to the previous page of "Servo Stiffness Adjustment" for proper adjustments.

* **TORQUE** Motor Torque Adjustments



When delivered from factory, it shall be set to the maximum current according to driver's specification. (90% position).
(MIN = 10% and MAX = 90%)
90% position = driver's maximum output current (PEAK)
10% position = driver's maximum output current ÷ 2

* **O.L** Overload Adjustment



When delivered from factory, it shall be set to the continuous current value according to driver's specification. (90% position).
(MIN = 10% and MAX = 90%)
90% position = continuous current value
10% position = continuous current value ÷ 2

Note:

1. The scales of setting knobs on panel board can be for your reference only. If the accurate setting values are required, please use measuring instruments to obtain these values.
2. The red area of setting knobs on panel board is arrow direction identification.

Speed Adjustment V. S. V Command

FIGURE 1 : SPEED ADJUSTMENT. V COMMAND +/-10VDC V. S. SPEED RANGE 0 TO 5000RPM

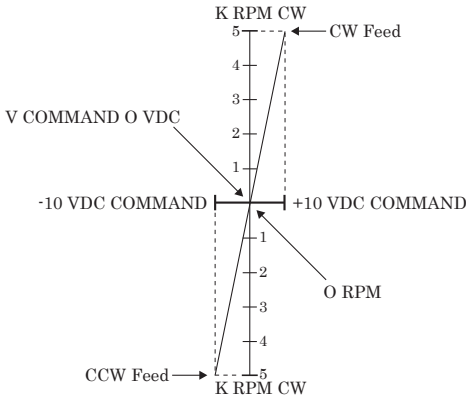
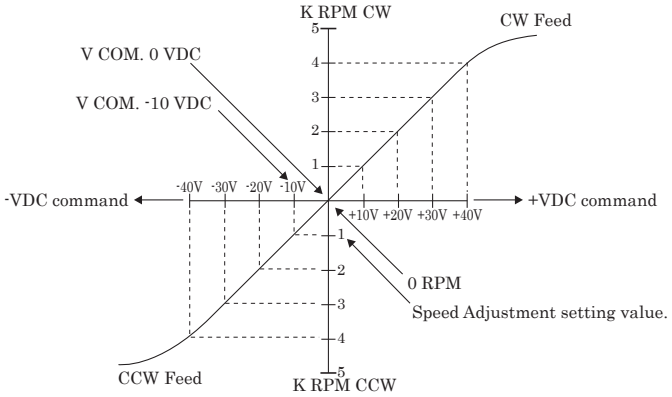


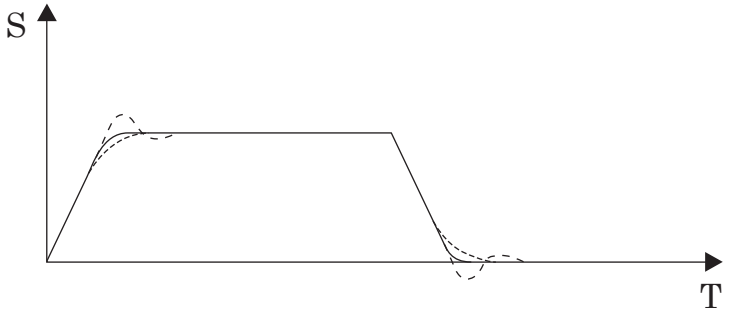
FIGURE 2 : +/-10VDC~40VDC IS RESTRICTED TO BE APPLIED. THE DRAWING IS FOR REFERENCE ONLY.



REMARK :

SPEED ADJUSTMENT VALUE, V COMMAND +/-10VDC. IS CORRESPONDING 0 TO 5000RPM(STANDARD PRODUCT) .IN SPECIFIC OCCASSINO, IF HIGHER THAN MAX. SFEED IS REQUIRED, THE HIGHER V COMMAND (> +/-10VDC) CAN BE APPLIED OR SEND BACK FOR ADJUSTABLE RANGE AMENDMENT. HOWEVER, THE V COMMAND VALUE DEFINITELY NOT TO EXCEED 40VDC AND AVOID EXCEEDING MAX. SPEED OF MOTOR.

AG.G Adjustment Reference Diagram

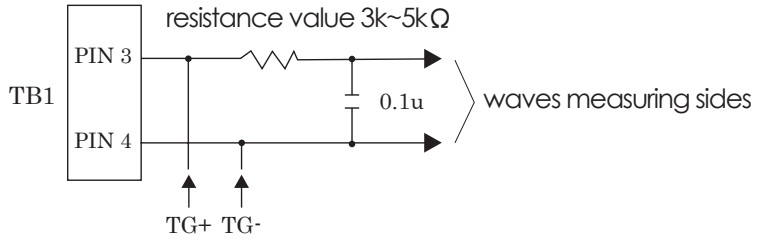


- - - - - - - - - - - - - - - strategy : rotate in clockwise direction to increase GAIN value and to improve the overriding phenomena in the left figure

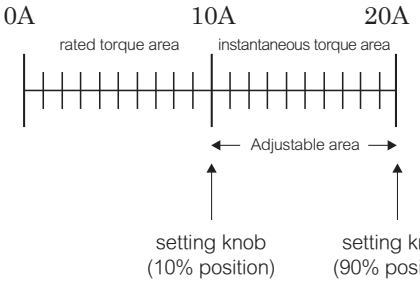
——————————— Fair

---------- strategy : rotate in counter clockwise direction to decrease GAIN value and to improve Lagging phenomenon in the left figure

Note : suggested measuring methods Illustrations



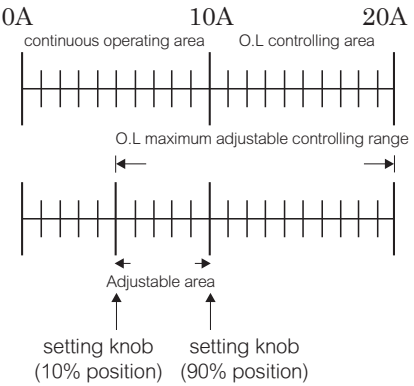
TORQUE Torque Adjustment Illustrations (Specifications samples：CDS-1015)



When deivered from factory,it was set at 20Ams（90% position）

Note：
For the adjustment of torque setting generally, we multiply 2 to motor,s continuous current specifications as the maximum instantaneous torque value (The value should depend on motor,s characteristics.

O.L Overload Adjustment Illustrations: (Specifications samples：CDS-1015)



When deivered from factory,it was set at 20Ams（90% position）

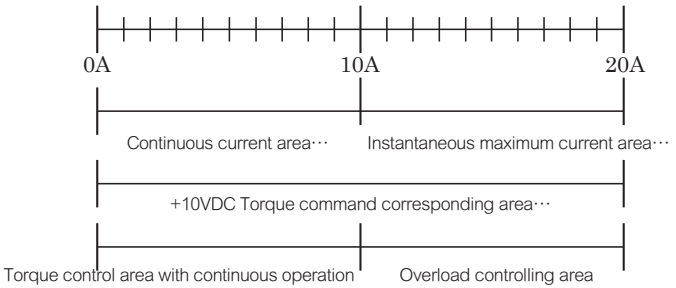
Note：
(1) For effecively providing loading protections of motor operating, the overload adjustment shall be in accordance with the motor continuous current specifications.
(2) When "TORQUE" torque adjustment is changed, the default torsion value is the upper limit of OL contolling ranges.

Torque command instructions (Torque control instruction)
Representative Code : OPTION C (OPTIONAL)

(Applications : CNC lathe automatic feeding machine IC trimming machine, programmable press control plastic injection machine,and various Torque-contrl devices···etc)
+10VDC=the maximum torsion. The input terminals are in the 23 and 24 PIN of TBI Utilizing DIP SW on PC board to select positive rotation torsion control(the position of cw is set to be ON) or reverse rotation torsion control(the position of ccw is set to be ON)and simultaneous bi-directional torsion control(cw and ccw sets are both ON)

Note:
(1) Torque command and speed command shall be independently provided.Please note torque command's polarity:
TB1 23pin is positive Voltage. TB1 24pin in 0V,if polarity reversed, The command is esteemed as invalid i.e.zero torque.
(2) When the setting of torque control DIP SW is done, the torque of this direction shall be 0. the correspondion Torque will not generated until the voltage command is input
(3) If the one-way torsion control is set, the torsion in other direction will operate according to normal condition
(4) If cw and ccw Torque will be controlled simultaneously, the ccw two-way torque shall use the same signal voltage (0~10VDC) command to control equal torque thanges.
(5) The control ranges of torque commands shall correspond to the maximum current of driver,s specification and command+10VDC. Owing to the current over continuous current shall be still controlled by the overloading function OL,therefore,the torque control area above continuous current can only be operated instantaneously only.
(6) When delivered from factory,the two-way insert plates were installed. Therefore, the Torque in these two directions is in zero status. They can only be operated until the command was input.(When purchasing this function,please speify the preferred controlling direction in advance).

Torque Command Specifications Illustrations(specification samples:CDS-1015C)



Please refer to next page to ontain the PC board layout of C functions.

STANDARO FUNCTION : TORQUE COMMAND (OPTIONAL) MODE : C

Function of Control For CW/CCW : Option U (OPTIONAL)

(Application examples: machine center with stepless variable of XYZ axes and automatic feeding, mesh printing machine, winding machine...etc., and various conditions with cw/ccw control)
As for the application of simple controller (such as PLC), it is required to use the cw/ccw switch (such as band switch) to adjust the speed and motion in normal counter direction. CDS series is equipped with this function, thus users can chieve Their objectives only by simple connections. (The optional external buffer device can also be purchased to smoothly control the starting and stopping actions.)

The function has many excellent features to provide wide applications. The following examples can be for your reference:

(1) Application on stepless speed control: CDS series can achieve high power via low speeds, thus it can meet the requirements of low speed and high torsion. In addition, the output of speed change rates under 0.1% can be used to as stable stepless speed control. If applied to milling machine, planomiller, lathes and E.D.M, the CDS series can also provide another automatic switchable option (i.e. a set of drivers can switch to drive 2nd or 3rd axis motor.)
Seperately through simple connections and the economical applications, the CDS series can provide economical and practical peripheral products, such as: M.P.G direct hand-wheel driving mechanism, economic model of single and double axes automatic engineering devices and the automatic drilling hole devices, etc.
Note: the operation instructions of the peripherals are not provided here.

(2) Simple positioning application: when high position precision is not required, the immediate-stop device of joint control function can be used to control the quick starting and quick stopping actions. Or, it can be equipped with buffer start-up device to smooth the positioning motion.
Note: if high precision is required, please select standard type equipped with position feedback device to perform precision control.

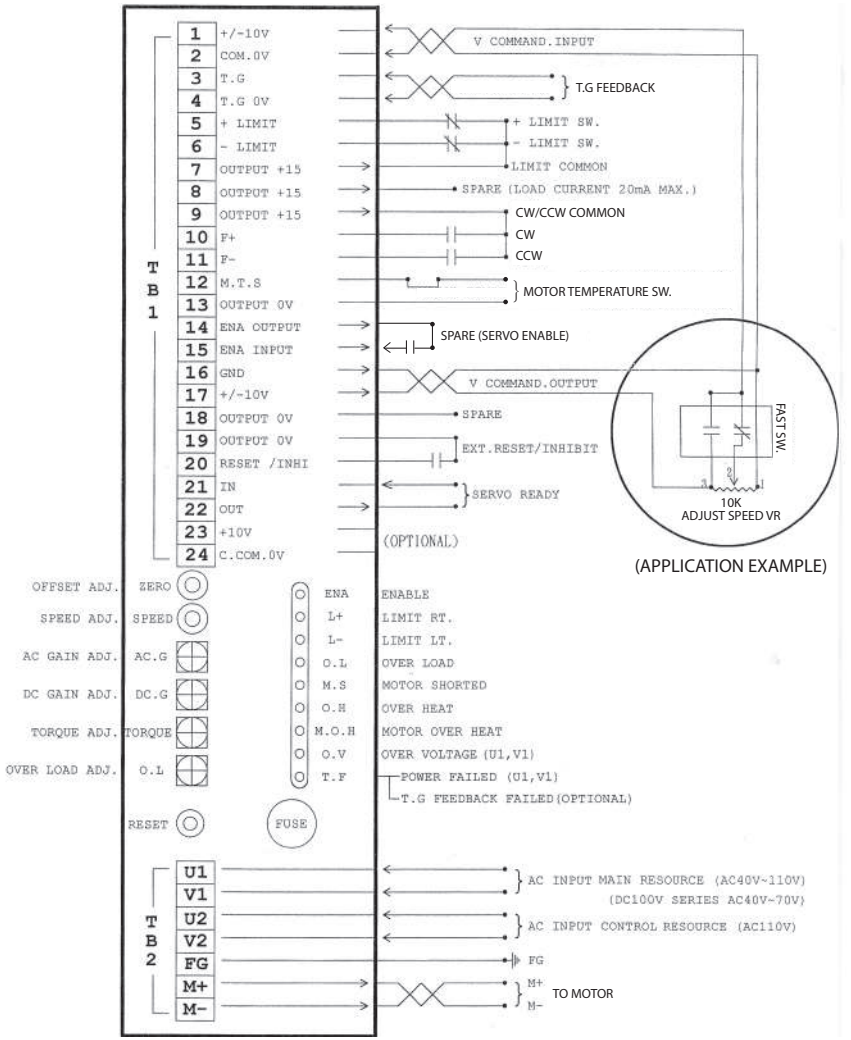
(3) Clutch and brake application: to high frequency's clutch applications, it can provide efficienct and non-slide features. Under certain clutch applications, it is a better choice, since it can instantly change speeds and automatically disable within 0.2~0.5 seconds after stop(can be adjusted, if necessary). Therefore, it usually applies in brake situation.
Note: (1) If the feature is added, the origin standard function is still in effect, but these two control methods can not be used at the same time.
(2) Fit U occasion, when ex-factory TB1 pin 19、20 is in "prohibit" status. When reset externally, please refer to page P5 components layout diagram connect CN 10 pins.

The signal function instructions and connection method of optional [U] function are describes in next two pages.

FUNCTION OF CONTROL FOR CW/CCW SIGNAL DESCRIPTION AND WIRING DIAGARM

CDS SERVO DRIVER V SERIES STANDARD U FUNCTION DEVICE

SIGNAL DESCRIPTION



REMARK : UNLESS SPECIFIED, ABOVE FIGURE ALL SIGNALS ARE DCV

STANDARO FUNCTION : CW & CCW DEVICE

MODE : U

MODE : U : FUNCTION P. C. BOARO

Trip-off protection at abnormal feedback: option F (OPTIONAL)

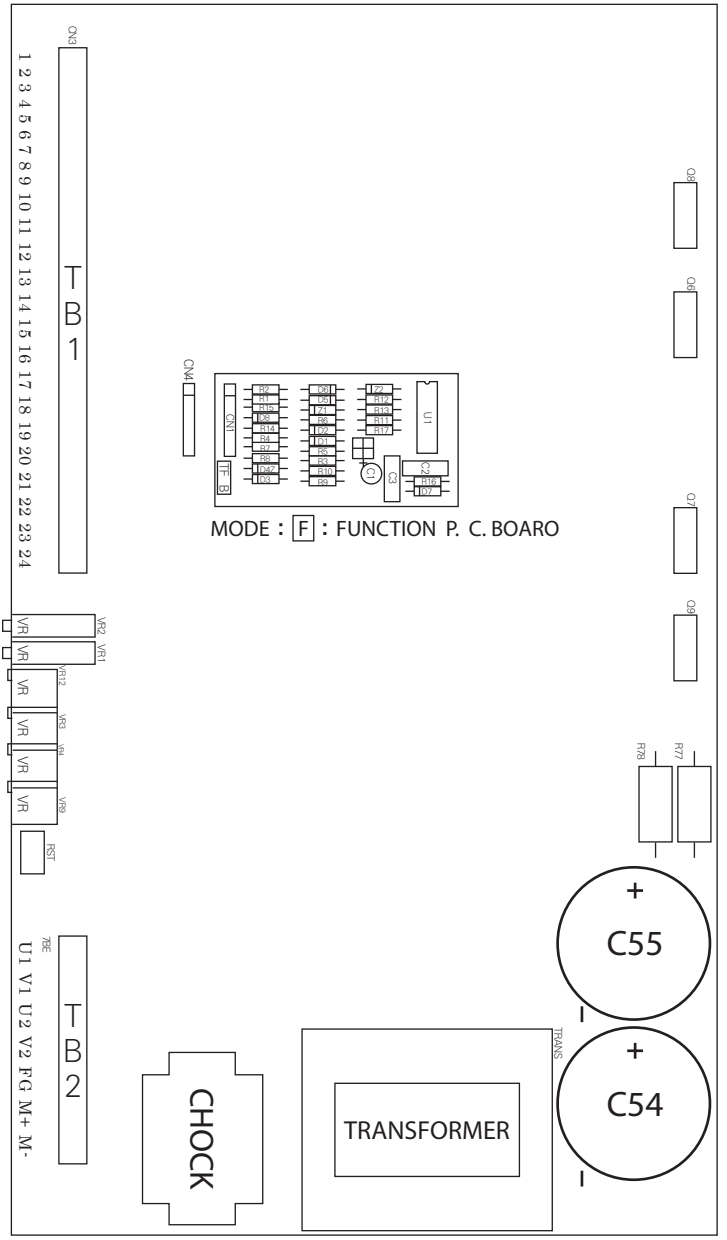
To those control systems that cannot provide protection of trip-off at feedback abnormal or cannot provide trip-off protections in the overall process; for example: the protection of trip-off at feedback abnormal cannot provided before setting controller's variables, or, system's detective function is ineffective when the controller loses of control, etc. For the above conditions, user must use this function to further protect the safety of operators and machine.
The F function display is installed in (T.F) and the LED indicator is commonly indicates several functions. The following conditions can lead to trip-off at feedback abnormal (T.F light on): (after the conditions are resolved, push RESET button to restart the enabling function.)

1. T.G wire +/- connected wrongly: kicking or short moving and then stopped, the T.F light on. (If without F function, kicking will continue and T.F ineffective.)
2. T.G wire +/- short-circuit: kicking or short moving and then stopped, the T.F light on. (If without F function, kicking will continue and T.F ineffective.)
3. T.G wiring disconnected: kicking or short moving and then stopped, the T.F light on. (If without F function, kicking will continue and T.F ineffective.)
4. T.G out of order (T.G voltage signals no output or unstable stop-and-continue outputs): kicking or short moving and then stopped, the T.F light on. (If without F function, kicking will continue or intermittent kicking, T.Fineffective.)
5. F/V function out of order (digital devices to convert into analog signals): kicking or short moving and then stopped, the T.F light on. (If without F function, shaking will continue, especially in low speeds, or continuous kicking, T.F ineffective.)
6. F/V poor signals (digital devices to convert into analog signals): kicking or short moving and then stopped, the T.F light on. (If without F function, shaking will continue, especially in low speeds, or continuous kicking, T.F ineffective.)
7. M+, M- poor output wiring or disconnected: motor cannot move, T.F light on (If without F function, the panel board is normal, but motor is motionless intermittent stopping, T.F ineffective.)
8. Motor damaged: e.g. armature breakdown, poor armature, and armature with excess wear, or oil invading to motor brushes or T.G brushes which makes motor motionless or speeds unstable, motor instantly trip-off and T.F light on. (If without F function, speed will be uncontrollable and motor cannot lock,floating continuously, T.F ineffective)

Note: for those without F function, please refer to the above instructions and page P23, item 9 abnormal speed feedback, to handle the inspection and identification of normal conditions.

Please refer to the next page to obtain the PC board layout illustration of F function.

STANDARO FUNCTION : FEED BACK FAILED (OPTIONAL) MODE : F



Trouble-Shooting:

To provide detailed explanations of previous instructions, most of the inspection and disposition instructions of abnormal operation are described in previous pages. The following descriptions shall only provide as references as inspecting procedures of abnormal condition. If you have further questions, please fax them directly to our service section with the number of 886-4-22117703, the service personnel shall provide prompt services.

Cannot Operate:

All LED lights are off ...(1) please refer to the power supply instructions on page P7 & P8 to ensure supplying power is accordant with specification
(2) please refer to page P5, inspect the fuse on PC panel board is normal or not.

ENA light on ...indicate the function is enabled: (1) inspect command voltage is normal or not.
(2) the speed of driver was adjusted to be 0.

L+ or L- light on ...indicate the limitation in that direction is achieved and can only rotate reversibly. If there is no need to use the function, the 5th and 6th PIN of TB1 shall be short-circuited.

O. L light on ...(1) refer to the item 4 on page P22 and the item 6 on page P25.
(2) check O.L setting knobs
(3) inspect the condition of mechanism
(4) the selection of motor specifications is proper or not.

M.S light on ...refer to the item 5 on page P22, motor short-circuit instructions.

O. H light on ...(1) refer to the item 6 on page P22. If O.H light frequently lit on, you shall refer to the item 1 on page P1 to reconsider the setting environments.
(2) shall select larger-sized driver and motor to match with.
(3) change methods of accelerating and reducing speeds.

M. O.H light on ...refer to the item 7 on page P22 and page P16.

O. V light on ...please cut out power supply instantly. Refer to page P7 & P8 about the power supply instructions and the item 8 on page P22 to identify voltage specification.

T. F light on ...refer to the item 9 on page P23 and page P35P. If the function is not added in, you still can follow this instruction to inspect and identify the problems.

All the M.O.H, L+, L- lights on ...please cut out power supply (U2,V2) instantly and inspect the wiring condition. OUTPUT+15V(TBI:7.8.9.14PIN) and OUTPUT 0V(TBI:13.18.19PIN) shall not be short-circuited, otherwise driver tends to be out of order.

Kicking... if added F function, kicking shall be stopped and T.F light on. If kicking continues, inspect command voltage is normal or not. If without F function, T.F light off. But whether have the F function or not, please refer to the item 9 on page 23 and page 35 to inspect command voltage in normal conditions or not.

High Frequency Vibration...
(1) refer to the item 3 on page 24, item 4 on page 25 or page 14 and page 15.
(2) The high frequency vibration will damage motor and its lifetime, please pay attention on this problem.

Motor Continuous Shaking...
(1) please refer to the item 3 on page 24, page 15 and the item 4 on page 35.
(2) For using F/V to replace T.G: if the linear manipulation of current signal is poor or GAIN values' setting is abnormal, it shall be shaking on and, if severely, be swinging back and forth.

Motor Continuous Swinging...
(1) refer to the item 8 on page 34.
(2) refer to the item 5 on page 24.
(3) If there is severe OFFSET deviation, refer to the item 1 on page P24 to adjust and modify.
(4) refer to page 15.
(5) voltage command abnormal.
(6) DC.G abnormally strong, it shall be reduced to improve.

Poor Positioning Precision...
(1) refer to the item 4 on page 25.
(2) refer to the item 3 on page 24, slightly increase AC.G can improve it. (over-adjusted shall be avoided, otherwise the motor will have high frequency vibration.)
(3) inspect transmission mechanisms
(4) the matching of motor specification is proper or not
(5) the torsion adjustment of driver is wrong.

CDS SERVO DRIVERS MATCHED THESE CONTROLLERS AND MOTORS

CONTROLLER:

- ANILAM (U.S.A.)
- ARIX (Taiwan)
- CYBELEC (Switzerland)
- DYNAPATH (U.S.A.)
- FAGOR (Spain)
- HEIDENHAIN (Germany)
- HUST (Taiwan)
- INTEK (Taiwan)
- LEADJECK (Taiwan)
- NUM (France)
- STYLE (Netherlands)
- VICKERS (U.S.A.)
- OTHER

MOTOR:

- ABB (Italy)
- ALSTHOM (France)
- BALDOR (U.S.A.)
- ELECTRO-CRAFT (U.S.A.)
- GLENTEK (U.S.A.)
- MAE (Italy)
- MOTOR POWER (Italy)
- MAVILOR (Germany)
- MAXON (Switzerland)
- QMC (U.S.A.)
- SANYO (Japan)
- SEM (U.K.)
- SHINANO (Japan)
- TAMAGAWA (Japan)
- UNITECH (Japan)
- OTHER

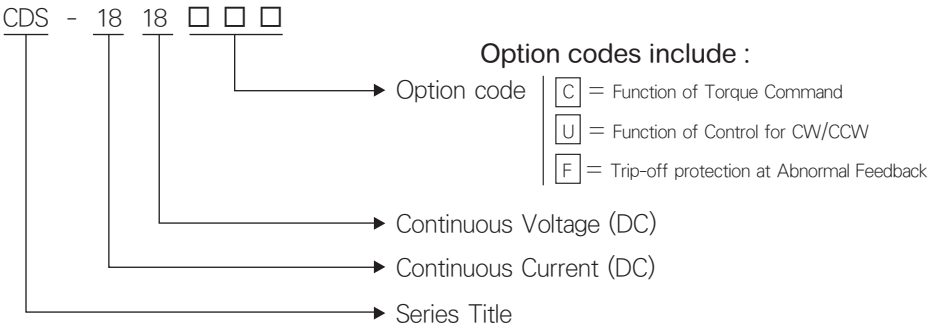
OPERATIONAL MANUAL【QP00907-1】CUSTOM-MADE MODELS SUPPLEMENT

CDS-1818F
CDS-2518F

TABLE OF SPECIFICATIONS :

SPEC \ MODE	CONT.CURRENT A RMS	PEAK CURRENT A PEAK	CONT. DCV RMS	MAX DCV PEAK	NET WEIGHT KGS
CDS-1818F	18	36	180	210	3.5
CDS-2518F	25	40	180	210	3.5

Type Code :



INSTRUCTION OF POWER SUPPLY :

		Specifcations of supply Voltage	Specifcations of supply Current
TB2	U1 V1	AC 40V~135V 50HZ/60HZ Max、permissible range AC34V~150V	CDS-1818F : MODE 18A
			CDS-2518F : MODE 25A
	U2 V2	AC 110V 50HZ/60HZ Max、permissible range AC90V~128V	MODE 1A

Note : (1) Voltage stabilizer sould be installed in environment with great current and voltage variance.

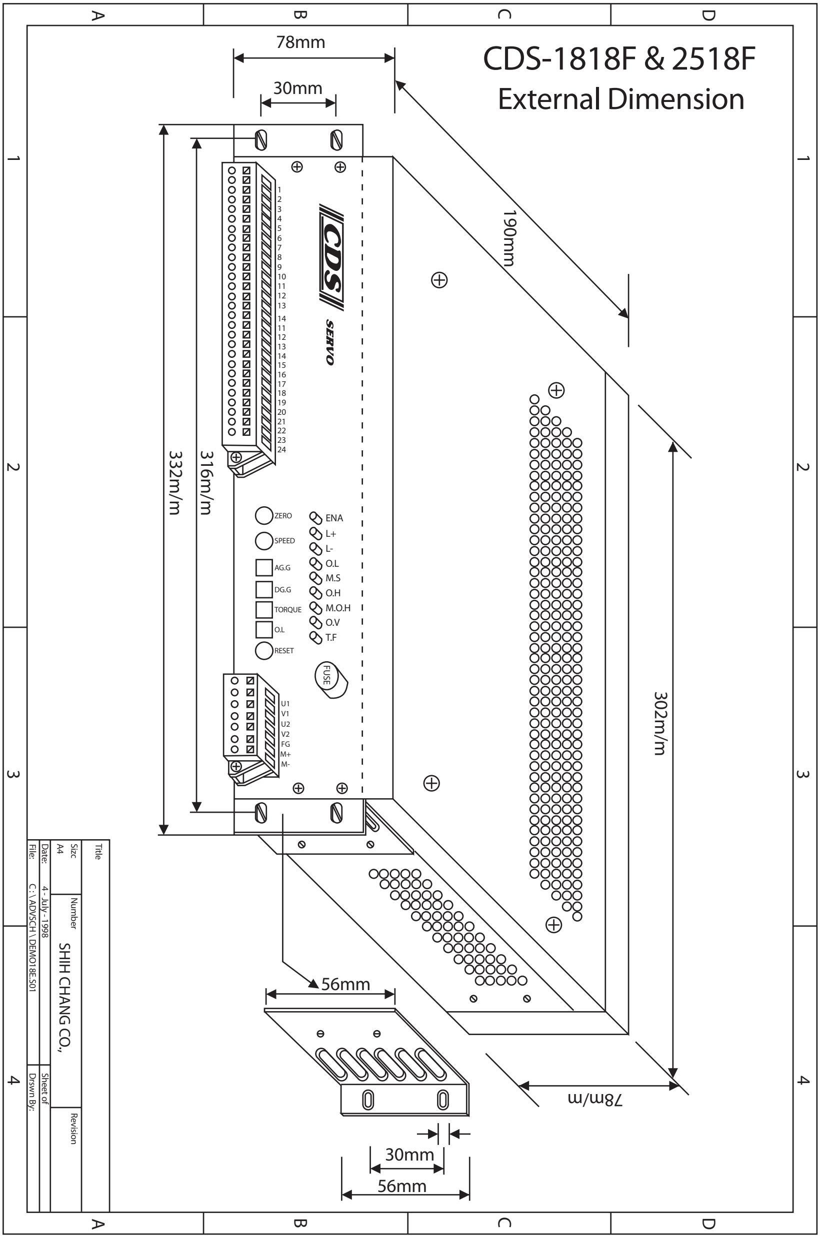
【1】The driver will trip-off if breaking occurs on the main input current and voltage of U1V1 alone(the T.F.LED on the panel board lights up). After the problem is corrected,the power will be supplied through automatic reset. If the power is over AC155V,the driver will trip-off due to overvoltage (the O.V on the panel board lights up).The power supply should be disconnected immediately in case of overvoltage. If the power supply is over AC170V ,the rectifying system or power unit may be damaged. In case that the power supply is below or about critical AC50V voltage drcrease may occur during heavy load. So the motor may not be able to run smoothly owing to the abnormal feedback.(The motor will vibrate with low frequency,make noises,or stop intermittently.) Inmore serious cases, the situations shall be deem as breaking on U1.V1,leading to the tripping-off of T,F with lit LED. After the problem corrected, the powerwill be supplied through automatic reset.

【2】If the power supply for the control system,U2V2,is over AC128V it may cause damages to internal elements. If the power is below AC90V the driver can not operate.(If the power supply is about the lower critical limit, unstable enable may occur intermittently).

【3】Generally speaking,power improvement device(e.g.:isolated transformer)should be installed at the front end of main power supply in order to improve the quality of supplied power.

【4】Driver of CDS Series is equipped with quality signal filter and voltage surge absorber. However, proper treatments should also be performed in environment with worse quality of power supply for better performance. For example , the power input terminal should not be used with other equipmemt ;cables with strong signal interference should avoid from putting in same wires duct and should be grounded accurately ; or filter and surge absorber should be installed to have good quality of power supply.

【5】Signals、wiring and othes relativer please refer to operation manual(QP00907-1)


CDS-1818F & 2518F
External Dimension
78mm
30mm
190mm
332m/m
316m/m
302m/m
78m/m
56mm
30mm
56mm
ZERO
SPEED
AG.G
DG.G
TORQUE
O.L
RESET
ENA
L+
L-
O.L
M.S
O.H
M.O.H
O.V
T.F
FUSE
U1
V1
U2
V2
FG
M+
M-
CDS
SERVO
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Size
A4
Number
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Revision
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