GH SERIES SERVO DRIVER (1.5~315kW)

北京超同步伺服股份有限公司
BEIJING CTB SERVO CO.,LTD.

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GH series servo driver ——— Let create more flexible mechanical movement

GH series servo driver produced by CTB with self—development is the top level in the world. With advanced design, comprehensive function, popularly application, it is the first choice for mechanical control.

GH series servo driver realized full closed loop servo control of AC induction motor and PMSM, centralizing on speed control, position control and torque control. The built—in programmable motion controller can completely replace the small PLC control unit, which can make electric control system more simple, reduce the cost of design and hardware, system operated more reliably. The PLC field programming makes equipment debugging more convenient and flexible,Shorten the periods. The user can freely choose built—in programmable motion controller on basis of mechanical equipment types and different control schemes, which makes device control tend to be more professional and featured.

GH series servo driver offer mechanical design engineer huge convenience in choosing, designing, debugging for it is with the advantage of abundant interface, simple operation and if it is standard application, it need not to use debugging. It can easy to interface with the numerical control brands system home and aboard, therefore can make your CNC more smart, showing the advantage of competition.

As unit of high—power of servo driver, especially display its better price in coordinate axis control of heavy machine tools, high—power servo drive applications, such as, forging equipment, printing equipment, hydraulic servo systems, lifting equipment, wire drawing equipment. It can absolutely make your large mechanism equipment move smartly.

Built—in programmable motion controller

GH series AC servo driver with built—in programmable motion controller can realize field programming logic control and high—efficient, flexible motion control.

- 12 Input/8 output standard PLC control unit
- Standard equipped with touch screen interface
- Built—in various motion control module
- Compatibility with ladder diagram program and C language program.

Various interface functions

- 12 input/8 output switch value input/output interface
- Two way analog quantity input, Two way analogy quantity output interface
- Two way encoder input interface, one way encoder output interface
- Two way high speed pulse input interface
- 1 set of multi—function differential pulse input interface
- Standard RS232 communication interface
- Modbus, CAN bus interface
- Powerlink, Mechatrolink Ethercat high speed fieldbus interface

Strong motion control function

Perfect control performance

GH series servo driver can perfectly realize V/F control of AC induction motor and PMSM, open—loop vector control, full closed loop vector control.

- Smooth running with ultra—low speed and big torque output.
- Effectively improve the dynamic response of the load changes
- Drive current reach minimum value when No—load running, achieve maximum energy saving drive.
- Position control, higher precision of torque control
- Optimization of current vector algorithm and hardware configuration make stronger overload ability of the drive.

Strong motion control function

Full closed—loop vector driver can perfectly realize accurate:

- Speed control
- Torque control
- Synchronization position (Angle) control
- Master—slave drive, electronic gear function
- Uniaxial orientation, and other functions
- External pressure sensors, can be applied to the hydraulic servo
- CAM curve movement control
- Fixed length cutting control
- Rolling control

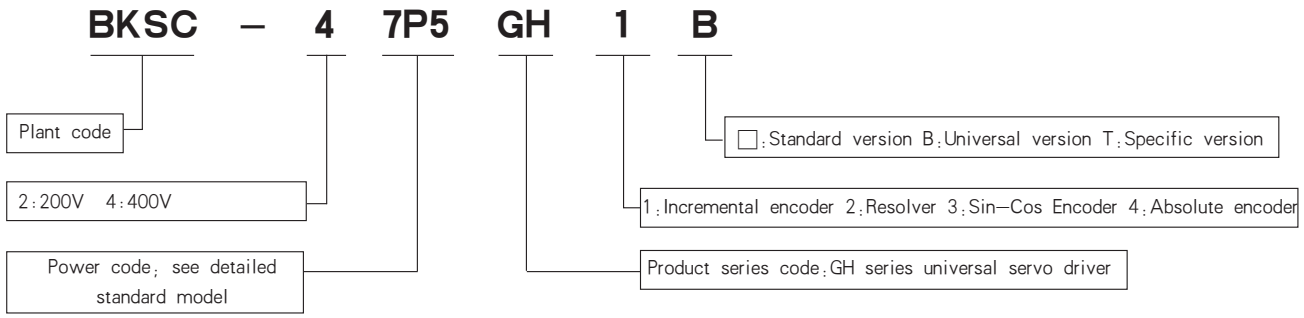
Suitable motor

AC induction motor, AC PMSM, variable frequency motor, three—phase asynchronous motor etc.

GH standard model and performance

Type BKSC—XXXXGHX		41P5	42P2	43P7	45P5	47P5	4011	4015	4018	4022	4030	4037	4045	4055	4075	4090	4110	4132	4160	4185	4220	4315
Adaptive motor capacity kW		1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	185	220	315
Output	Capacitor KVA	2.5	3	5.5	8.5	11	17	21	24	30	40	50	60	72	100	125	138	194	200	280	340	460
	Current A	3	5	8	13	17	25	32	37	45	60	75	90	110	152	180	230	255	336	370	450	630
	Max: output voltage	Triphase380/400/415/440V corresponding input voltage																				
	Max: output speed	4 grade motor 32000rpm;1600HZ																				
Power resource	Rated voltage、frequency	Triphase380/400/415/440V;50/60HZ																				
	Voltage fluctuation range	+10%,—15%																				
	Frequency fluctuation range	±5%																				
Control characteristic	Control mode	Sine wave PWM modulation, entire closed loop Vector control																				
	Torque characteristic	Basic frequency below 200% rated torque output, precision: ±5%																				
	Speed adjustable range	1:15000																				
	Speed control precision	±0.1%																				
	Frequency setting resolution	Digital quantity:0.01Hz analog: unipolar maximum output frequency/4092; bipolarity maximum output frequency/2046																				
	Site control precision	±1 pulse																				
	Acceleration	0 ~ 30000S																				
	Braking mode	Dynamic braking 125%,125% rated torque; internal braking unit																				
	Overload capability	200% rated current 30S																				
Input and output interface	Digital quantity input	12 photo coupler isolated input; input mode: PNP and NPN are optional																				
	Digital quantity output	6 photo coupler isolated output:24V,10mA																				
	Analog quantity input	2 path:—10V ~ 10V.0 ~ 10V																				
	Analog quantity output	2 path:—10V ~ 10V																				
	Relay output	1 path: normally open/closed contact:AC250V/DC30V,1A																				
	Failure output relay	1 path: normally open/closed contact:AC250V/DC30V,1A																				
	Encoder input interface	2,Motor encoder, incremental,rotary resolver, sin—cos/absolute encoder are optional, external encoder: incremental encoder is optional																				
	Impulse input	1,directional impulse or ortho impulse																				
	Encoder output interface	1,maximum received frequency 300KHz;line drive received mode:RS422 standard																				
	Bus interface	RS485,CAN,MECHATROLINK,POWERLINK,ETHERCAT																				
Control function	Speed control	Range:0 ~ 32000rpm;direction:positive and negative; speed command: analog quantity, impulse frequency, Multistage speed control, communication																				
	position control	self—zeroing, Reciprocating positioning, Multipoint position																				
	torque control	Rolling control, swing control, torque limiting																				
	Other function	External encoder positioning, synchro—driven, hydraulic servo, PID control																				
Protection function	driver/ motor over current	independent driver, over—current test function for motor																				
	driver/ Motor overload	independent driver, over—current test function for motor																				
	Motor overheat	internal thermal protection interface of motor																				
	Low voltage/over voltage	Major circuit busbar voltage is lower than 400V,undervoltage alarm output, major circuit busbar voltage is higher than 800V, over—voltage alarm output																				
Using environment	Using field	no dust, aggressive gas and flammable gas																				
	Temperature	—10—45℃																				
	Moisture	Less than 95%RH(non—condensing)																				
	Vibration	Vibration frequency ⩽ 20Hz, 9.8m/s2;20Hz ⩽ Vibration frequency ⩽ 50Hz;2m/s2;																				

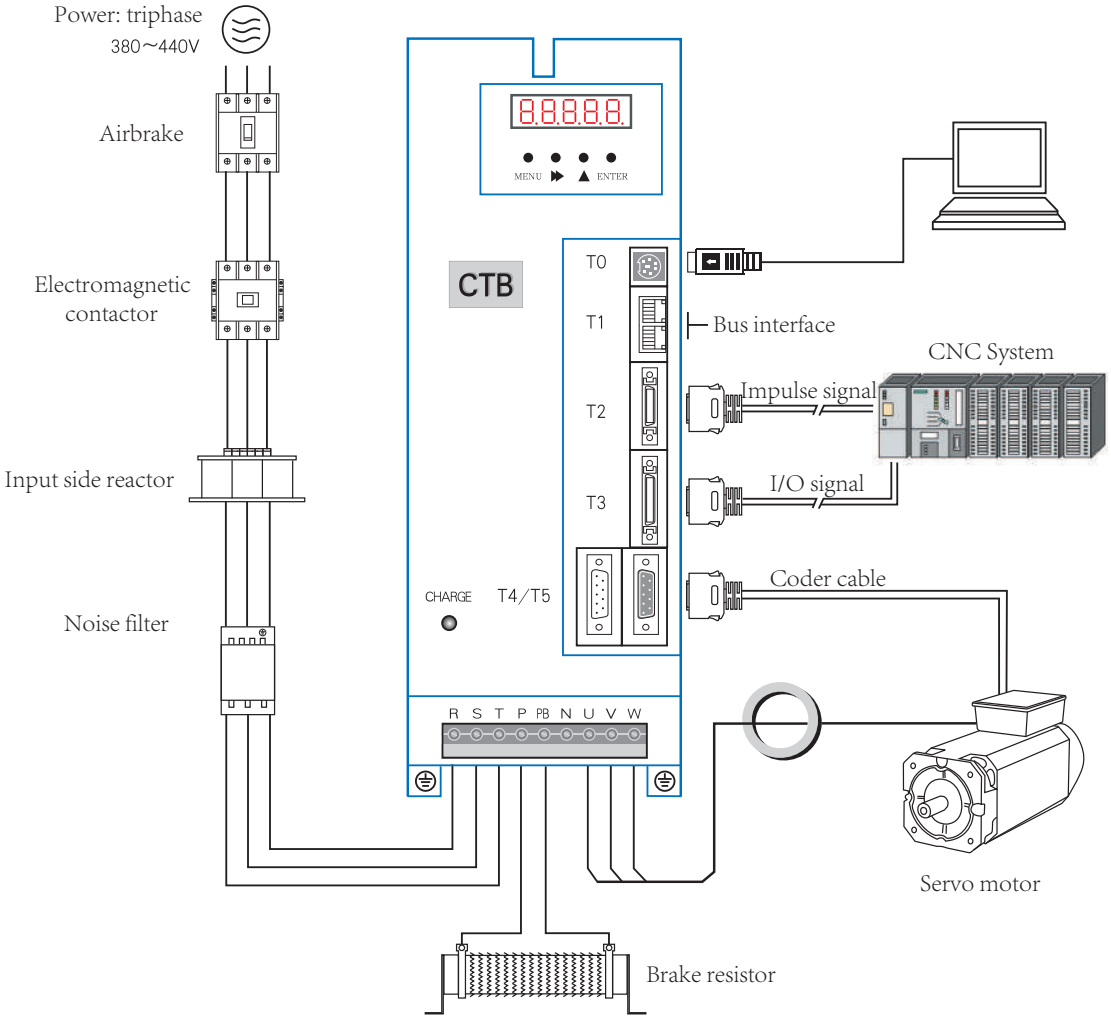
Demonstration of driver (7.5kw for example)



Software function

Function name	Usage	Purpose	Function demonstration
Arbitrary point positioning	Mechanical transmission	Automatic process control	Servo motor starts running to the setting position , localization stopped and sent position signal when received run command
Reciprocating positioning operation	Mechanical transmission	Automatic process control	Reciprocating motion between two setting positions, can set speed of movement; Typical application: double housing planer
Multi–point positioning	Mechanical transmission	synchronous process control	Can set up 256, corresponding to the input signal is valid, the motor running to the corresponding position
Impulsive synchronization	Mechanical transmission	Synchronous control	Operation of Servo motor is synchronous with the input pulse, synchronization ratio can be set, often used for NC machine tool and numerical control equipments.
Synchro–driven	Mechanical transmission	synchronous running	Two(more than two sets)servo motor achieve synchronization
Torque control	Press machine	Output torque adjustment	Use analog input signal or communications real–timely to adjust the motor output torque, meet the needs of the load
parallel drive	Roller way, drive machine	Achieve equilibrium output	Multi–driver via bus communication, drive same load together, ensure each motor with same output.
Constant length cut	transverse cutting machine wire cutting	Automatic synchronization fixed–length cutting	Driver test the length of cutting object via outer encoder, automatically calculates starting position, synchronously cutting when reaching cutting length.
PLC programming	General machine	logic control	Can provide at most 12 points input,8 points output programming control function, users can program freely as per mechanical control needs
Independent arithmetic	Rotary cutting machine and other equipment	Automatic calculation of running speed	Driver automatically calculates feed speed of tool frame to achieve constant linear speed rotary cutting as per the speed of main drive roller and tool frame position.
Input/output condition monitoring	General machine	Monitoring interface condition	Monitor all input/output signal of driver via U2 parameters, make convenience for debugging and troubleshooting
Connect touch screen	General machine	Provide the man–machine interface	Can connect the standard touch screen to driver via serial interface, operate driver, achieve running, parameter adjustment, condition monitoring etc. function
Hydraulic servo drive	Hydraulic equipment	Automatic pressure control and energy saving	Test fluid pressure via pressure sensor, achieve constant pressure control via PID adjustment.
Bus communication	Production line	remote automatic control	Driver connected to internet via MODBUS, CAN, POWERLINK etc. Bus to achieve centralized control
Remote operator	General machine	The simple remote monitoring	Achieve driver remote operation via connecting with remote digital operator, revise parameters, monitor Important operating data

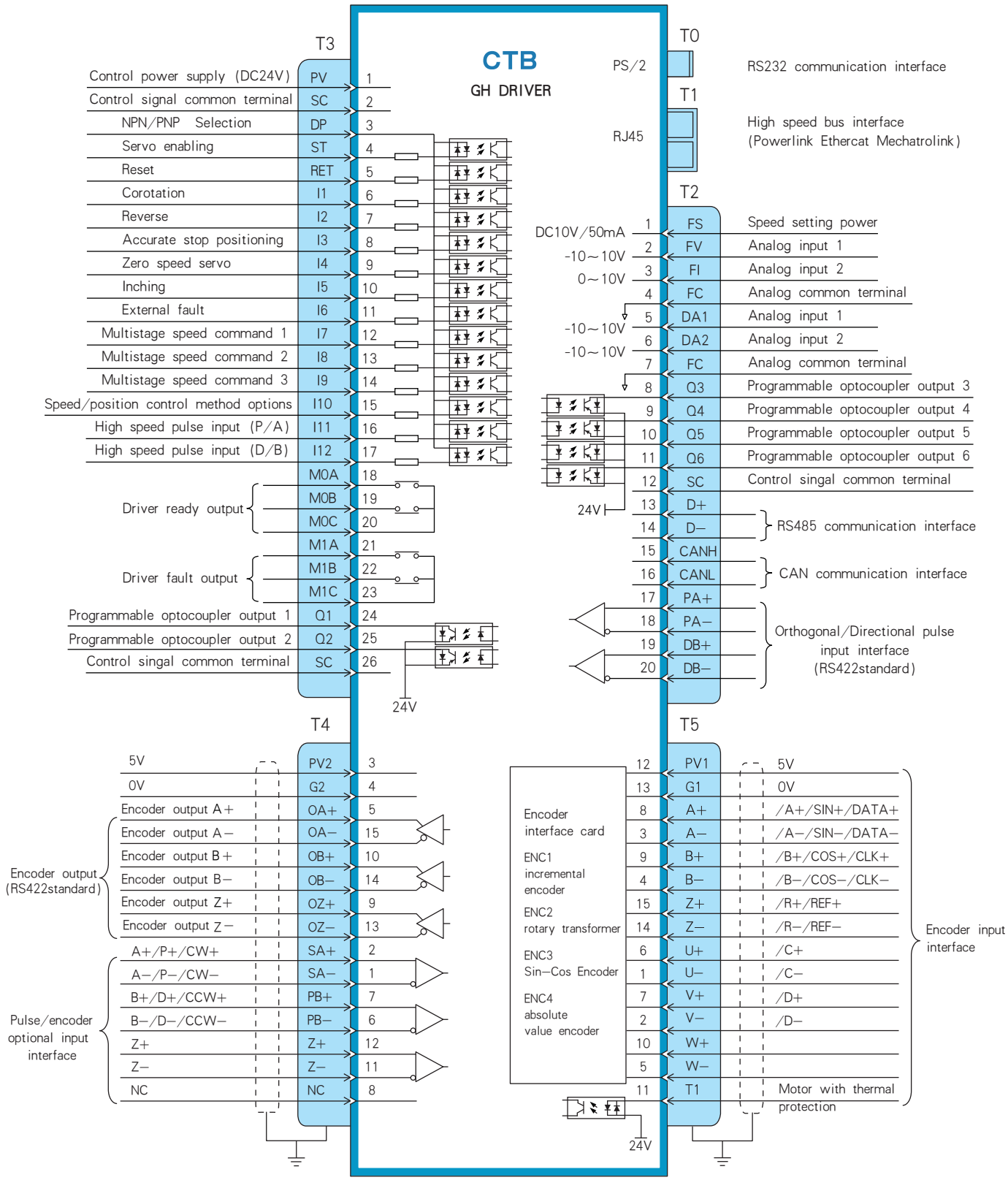
System connection schematic (7.5kw for example)



Instruction of components type selection

Name	Application	Considerations in type selection	Remarks
Airbreak	Connect on or out off driver power	Type selection according to the 150% of rated current of driver	Refer to GH Common used accessories selection(PO9)
Electromagnetic contactor	Used to automatic power for driver or automatically cut off power supply if failure.	Type selection according to the 150% of rated current of driver	
AC reactor	To improve the power factor of power grid, restrain power higher harmonic	Type selection according to the 100% of rated current of driver	
Noise filter	Prohibit the interference of power from driver	Type selection according to the 150% of rated current of driver	
Braking resistor	Consuming the recovered energy of driver	Type selection according to the manufacture's standard	Refer to GH Common used accessories selection(PO9)
Filter magnetic ring	Prohibit the external radio frequency interference and common mode interference	Type selection according to the manufacture's standard	Refer to GH Common used accessories selection(PO9)

GH control wiring diagram,(taking 7.5kw as example)



Note items

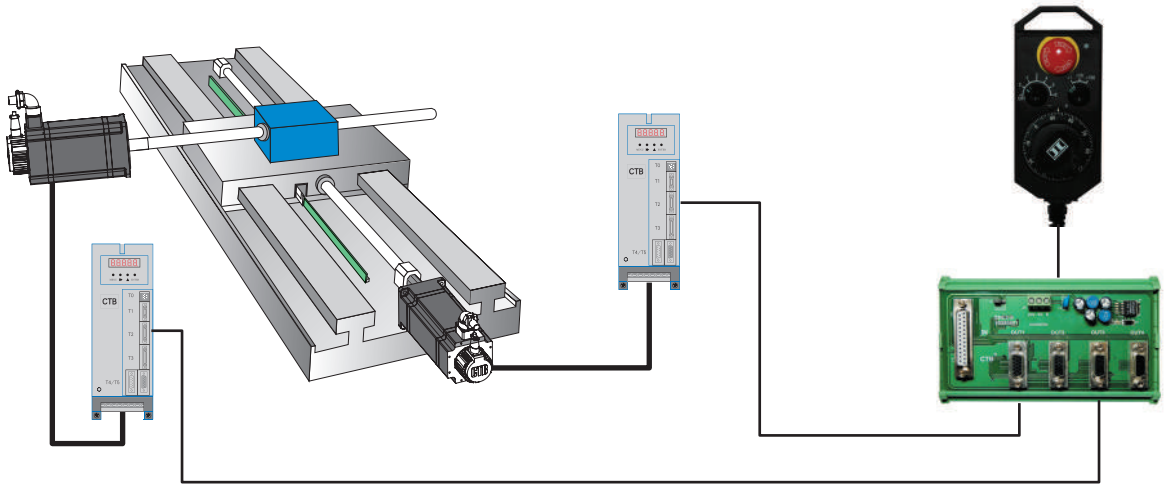
◆ Encoder signal wire shall use double twisted shielded cable. Analog quantity input signal wire shall use shielded cable.

◆ The wiring diagram is schematic diagram, When users need electrical design, can ask manufacturer for specific technical advice or formal drawings.

Control circuit terminals

Type	Name	Function		Signal standard
Control power input	PV	external control power input terminal		DC24V 500mA
	SC	External control power 0V input terminal/control signal common terminal		
Control signal input	DP	NPN/PNP selection terminals		
	ST	Servo enabling		Optocoupler input optical PNP/NPN (optional) PNP: 0V Input Validation NPN: 24V Input Validation
	RET	Fault resetting		
	I1	Forward direction running	Programmable input	
	I2	Reverse running	Programmable input	
	I3	Accurate stop positioning	Programmable input	
	I4	Zero speed servo	Programmable input	
	I5	Inching	Programmable input	
	I6	External fault input	Programmable input	
	I7	Speed command1	Programmable input	
	I8	Speed command2	Programmable input	
	I9	Speed command3	Programmable input	
	I10	Speed/position control method options	Programmable input	
	I11	High-speed pulse input	Programmable input	24V, 200KHz
	I12	High-speed pulse input	Programmable input	
Motor thermal protection	T1	Motor thermal protection signal input		Normally open, normally closed optical
Programmable output	Q1 ~ Q6	Programmable output		Optocoupler output 24V ⩽ 10mA
Relay output	M0A-M0B-M0C	Driver ready to output		AC250V 1A DC30 1A
	M1A-M1B-M1C	Driver fault output		
Analog input	FS	Internal speed setting power supply		DC10V 50mA
	FC	Analog common terminal		0V
	FV	Bipolar analog input		-10 ~ 10V
	FI	Single polarity analog input		0 ~ 10V/4 ~ 20mA
Analog output	DA1 DA2	Analog output		-10 ~ 10V
Encoder/pulse input	PV2/G2	Encoder power		DC5V 100mA
	SA+ SA-	Pulse/encoder A phase input		Linear drive receiving RS422 standard
	PB+ PB-	Pulse/encoder B phase input		
	DZ+ DZ-	Pulse/encoder C phase input		
Encoder output	OA+ OA-	encoder A phase output		Linear drive output RS422 standard
	OB+ OB-	encoder B phase output		
	OZ+ OZ-	encoder Z phase output		
Motor encoder input	PV1 G1	Provide terminal for encoder power		DC5V 100mA
	A+ A-	encoder A phase input		Linear drive receiving RS422 standard
	B+ B-	encoder B phase input		
	Z+ Z-	encoder Z phase input		
	U+ U-	encoder U phase input		
	V+ V-	encoder V phase input		
	W+ W-	encoder W phase input		
RS232 communication	T0	RS232 communication		RS232 standard
RS485 communication	D+ D-	RS485 communication		RS485 standard
CAN communication	CANH CANL	CAN communication		CAN
High-speed bus interface	TI	Powerlink Ethercat Mechatrolink BUS communication		Standard internet
Ground terminal	E	Shield layer of signal line shall be grounded		

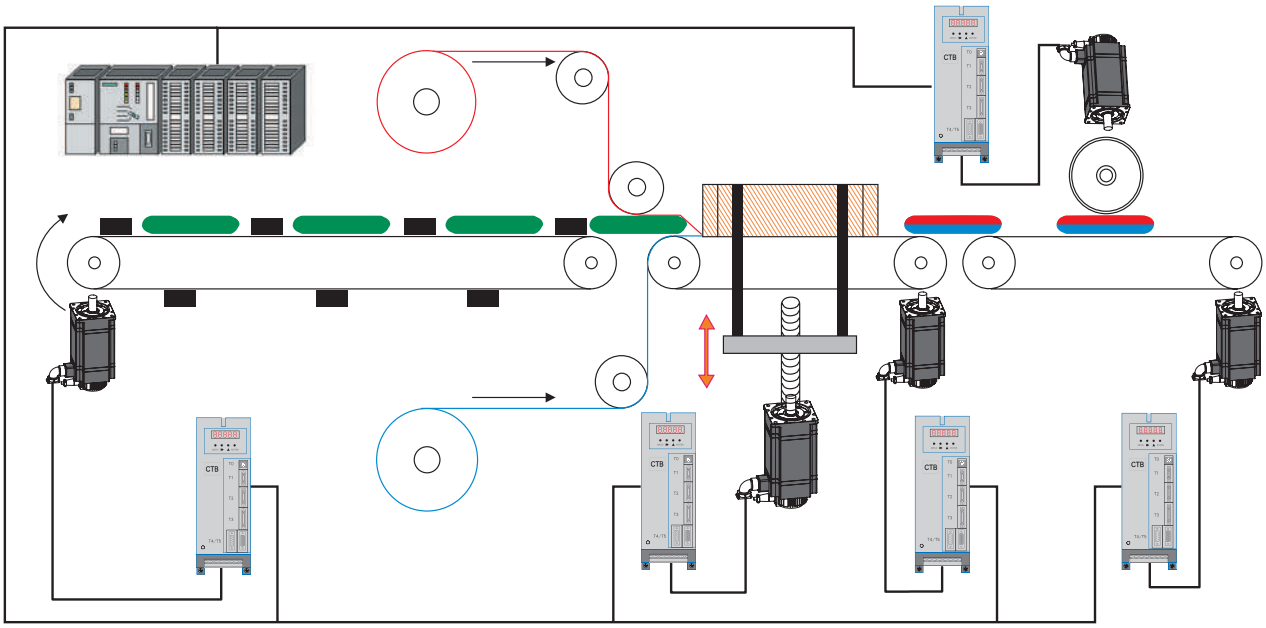
Shaft fixed position system



GH ac servo drive can be widely used in coordinate axis control of CNC milling machine, lathe, gantry machine tools, which can realize:

- Coordinate axis back to zero automatically
- Independent handwheel control of coordinate axis
- Can connect with various cnc system or PLC system interface via pulse interface, analog interface, bus interface.
- Absolutely independent drive with manual single shaft
- Programmable automatic control and auxiliary control of machine tool

Production line transmission and positioning system



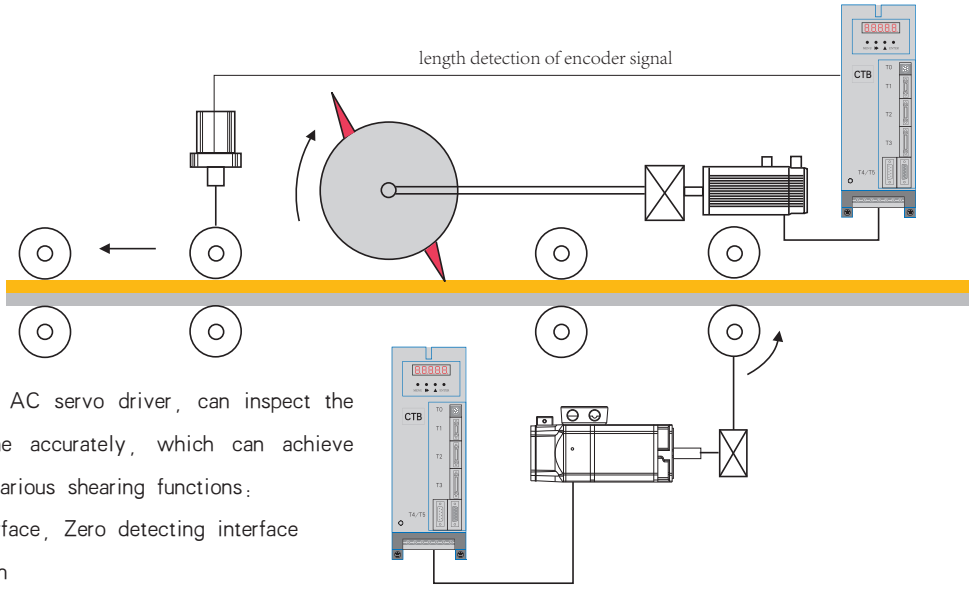
Precise position control, torque control and network functions of GH ac servo drive can be fully used in:

- Packing device and packing production line
- Material transfer production line
- Assembling production line such as Car, home appliance etc.
- Filling production line

Shearing production line

Widely applied in:

- Cross-cutting machine, shearing plate machine
- Wire shearing, bending equipment
- Rolling shear production line
- High speed flying shear (synchronous tracking shear)



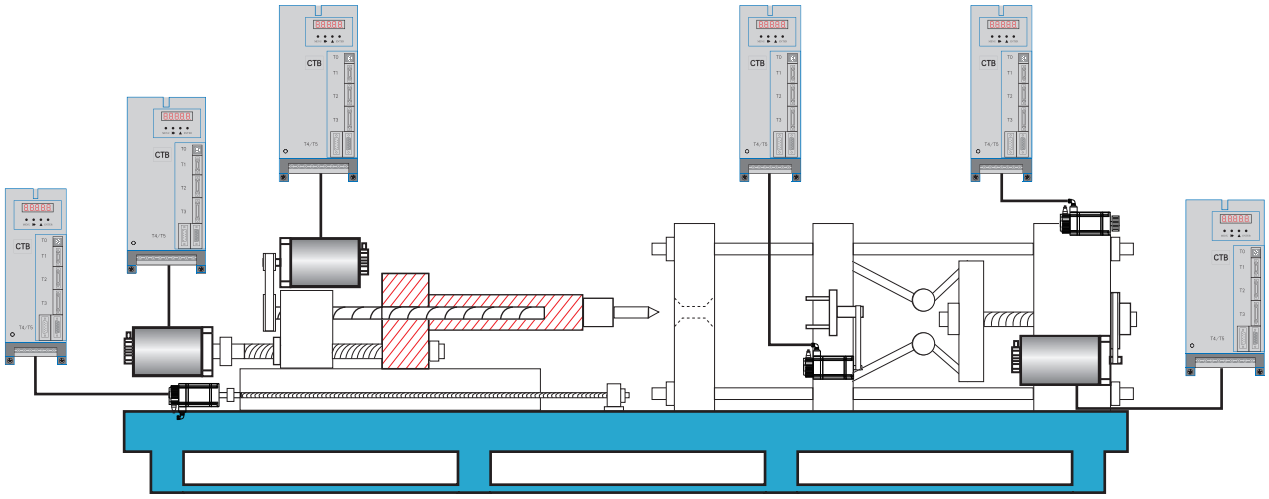
Use external encoder interface of GH AC servo driver, can inspect the position or length of controlled machine accurately, which can achieve fixed length, positioning control, fulfill various shearing functions:

- Provide standard external encoder interface, Zero detecting interface
- Built-in multiple shear control program
- Provide man-machine interface, built-in PLC unit, maximally simplify control system
- Suitable for various section bar, wire rod, plate material shearing equipment

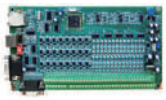
All electric injection molding machine applying solutions

Adopt GH AC servo driver to drive CTB servo motor or water-cooling motor though bus connected computer, which can provide a complete set of servo control solution for all electric injection molding machine and achieve:

- Movable mould fast moving, mould clamping of big torque
- Coordinated control of glue-smelting motor and plastic injection motor makes backpressure of melt glue adjust flexibly, improve the quality of melt and efficiency
- Closed loop of plastic injection pressure sensor and motor accomplishes accurate control of pressure, speed, injection volume
- Make the motion fulfill more accurate, easy for adjustment regarding servo control of thimble, moulding-adjustment, injection

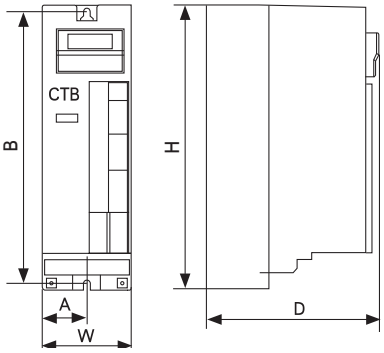


General parts selection

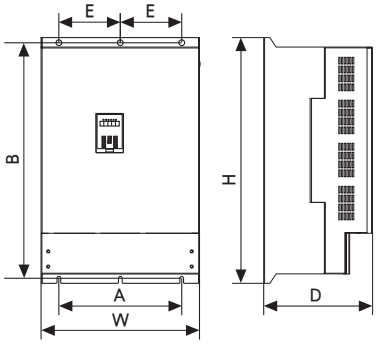
Name	production	Model type	usage	Proformance index
Touch screen		TPC7062KS	Used for displaying driver parameter setting and dynamic graphical display terminal	Voltage:DC24V Size: 7 inches Hole size:215x152 Communication interfrace:RS485/RS232
Text display		OP320-A-S	Used for technological parameter setting and display	Voltage:DC24V Screen size:3.2inches Hole size:163x85 interfrace:RS485/RS232
speed setting potentiometer		WX110	Used for speed adjustment of servo driver	Resistance value:20KΩ Resistance tolerance: 10% Power:1W Voltage:100V
External encoder		CE15Z-2500-0L	Used for mechanical position and speed test	Voltage:DC5V Line number:2500P/R Output method: linear drive
Handheld pulse pattern generator		ZSJ-1-003-100	Manual locating for servo motor, used for machine tools, lifting, transmission etc.	Machine handheld pulse pattern generator
Encoder signal selection card		ENC3-1	Used for multi-channel encoder input selection, suitable for one driver with multi motors.	Input: 3 channels(at most) Output: 1 channel
Remote I/O board		F103A	Used for extension of driver I/O terminal	16 input/ 8 output RS485 interface
Handwheel distributor		ENC1-4	Distribute handwheel signal to multi driver, manual locating for different servo axis via axis selection, suitable for machine tools with manual servo control	Input: 1 channel Output: 4 channels(at most)
Pulse converter		PC1	Linear drive signal transfers to 24V level signal	Input:5V linear drive signal Output: 24V level signal
		PC2	24V level signal transfers to linear drive signal	Input:24V linear drive signal Output: 5V level signal
Communication cable		RS232-P1	GH servo driver and PC communication	CTB GH servo driver standard communication cable

BKSC-XXXXGH		41P5	42P2	43P7	45P5	47P5	4011	4015	4018	4022	4030	4037	4045	4055	4075	4090	4110	4132	4160	4185	4220	4315
Brake resistor	Power W	200	400	600	800	1000	600	800	1000	1000	1500	2000	2000	2500	2500	2500	2500	2500	2500	2500	2500	2500
	resistance Ω	300	150	50	40	32	50	40	32	32	30	20	20	20	20	20	20	20	20	20	20	20
	number	1	1	1	1	1	2	2	2	2	2	2	2	2	3	4	4	5	6	8	8	12
Air inlet switch A		10	10	16	20	25	40	40	40	75	100	150	150	200	250	315	350	350	400	630	630	800
incoming and outgoing cable	specificmm^2	2.5	2.5	4	6	6	10	10	10	16	25	25	25	50	50	60	70	80	100	120	150	200
	requirement	Outgoing cable please use 3+1 shield cable,two ends shall be grounded																				

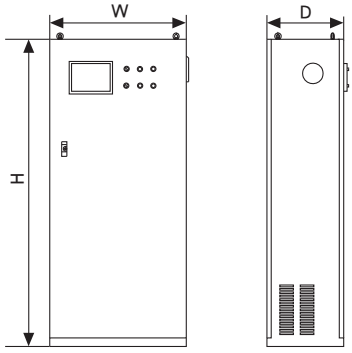
Outline and mounting size



(figure 1)
1.5～11 kW Servo driver outline figure



(figure 2)
15～160 kW Servo driver outline figure



(figure 3)
185～315 kW Servo driver outline figure

Size / Model	A	B	W	H	D	E	Terminal srew	Mounting srew	Weight(kg)	Remark
BKSC-41P5GH	45.5	276	91	290	200	–	Line card width 3mm	M6	3	(figure1)
BKSC-42P2GH										
BKSC-43P7GH										
BKSC-45P5GH	80	276	132	290	200	–	Line card width 5mm	M6	5	
BKSC-47P5GH										
BKSC-4011GH										
BKSC-4015GH	140	380	194	400	230	–	M6	M6	14	(figure2)
BKSC-4018GH										
BKSC-4022GH	236	376	282	390	270	–	M6	M8	20	
BKSC-4030GH										
BKSC-4037GH	300	376	380	390	270	–	M8	M8	26	
BKSC-4045GH										
BKSC-4055GH	392	376	472	390	270	196	M10	M8	33	
BKSC-4075GH										
BKSC-4090GH	360	690	464	720	320	180	M10	M16	90	
BKSC-4110GH										
BKSC-4132GH										
BKSC-4160GH										
BKSC-4185GH	–	–	800	1800	450	–	–	–	230	(figure3)
BKSC-4220GH										
BKSC-4315GH										

Our GH marry your machine to realize perfect mechanical control combination