国机集团 | TRiED 天津电气院


# Dynamic Braking Unit
# User guide

# 制动单元用户指南

# TACG Series Dynamic Braking Unit User guide
# TACG系列动态制动单元用户指南

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TRIED customers with technical support. Users may contact the  nearest TRIED local sales ofÞce or service center.

TRIED为客户提供全方位的技术支持，用户可与就近的TRIED办事处或客户服务中心联系。



地址:天津滨海高新区创新大道354号

Homepage  网址:  www.tried.com.cn

Customer Service Hotline  客户服务及投诉热线 :  022-8437 2890

Version  版本 :  V 1.0

## Introduction 简介

TACG Series braking unit is designed to lead the regenerative power by the inverter during braking to the braking resistor to impr ove the Inverter performance and shorten braking time.

TACG 制动单元的作用是将马达在减速过程中产生的再生能量，以耗能的形式消耗在制动电阻上，从而改善变频器制动性能及缩短变频器的制动时间。

## Inspection before in st alla tion 安装前检查

All the regenerative unit has been tested before delivery, please confirm below before installation. If any problem, please contact us.

所有制动单元在出厂前，均经过严格仔细的检测，测试。在您开箱验收时，请确认如下事项。如有异常，请与我公司业务部联系。

- Check the model disp atched if it' s the same as your order.
  与订购的产品是否一致?查看TACG 制动单元的型号。
- Any damage for the unit during transportation.
  查看整体外观，检查制动单元是否在运输中受损。

## Sa fety Notice 关于安全的注意事项 ,

### Danger 危险

- Abuse may cause danger, personal injury & device damage.Make sure the input power cut o ffbefore wiring, wait until the light of the Inverter turn off.
  错误使用时 会引起危险情况，可能会导致人身伤害和设备损害。接线前，请确认输入电源已切断，变频器切断电源后应等待指示灯熄灭后进行接线作业。
- Wiring can only be done by electrical professionals.
  应由电气专业人员进行接线作业。
- Do not touch the terminals of the braking unit during operation. Do not connect the terminals with enclosure of the braking unit,short circuit not allowed among terminals.
  通电后勿触摸制动单元的端子，切勿将回馈装置（回馈单元）上的端子与回馈装置（回馈单元）外壳连接，端子之间切勿短路。
- (Aluminum heat-sink) should be grounded。
  外壳（铝散热器）要保持良好的接地。

### Cautions 注意

- Read the manual before using the braking unit !
  在使用制动单元之前，请仔细的阅读本手册。

# Dynamic Braking Unit 制动单元

## Product Profile 产品简述

regenerative energy produced in the process of decelerat--ing the motor, converting that energy into h eat.Regenerative energy flows from the motor into the inverter DC Bus ,manifested as increased bus voltage . The advantage gained using the DBU is impr oved braking performance and shorter deceleration time of the load.

制动单元的作用是将减速过程中产生的再生能量分流到制动电阻上。电机将能量转化为热量。再生能量从电机流入逆变器直流母线，表现为增加总线电压。 使用 DBU 获得的优势是提高了制动性能并缩短了负载的减速时间。

## Product Parameters 产品参数

SAFETY:The tripping function against IGBT short circuit breakdown can avoid the fire caused by IGBT short circuit Breakdown of resister after overload run.

安全性:具有IGBT短路击穿脱扣功能,可能有效地防止因IGBT击穿,电阻器长时间过负荷运行而引起的火险隐患。

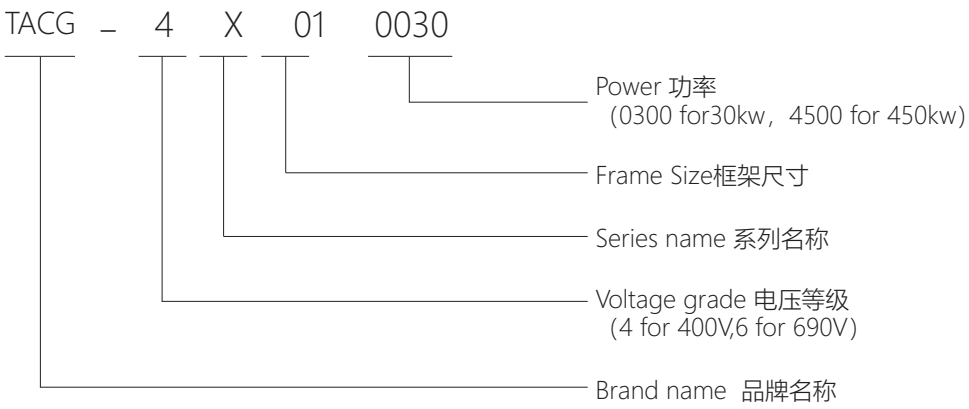
WIDE COMPATIBILITY: It's special design makes it com patible withg eneral resistance rather than non-inductive resistance.It's adjustable chopper voltage DC 630V-DC 760V is applicable to various low-voltage inverters.

广泛性:特殊设计可以使用普通电阻,不必选择无感电阻。斩波电压 DC 630V-DC 760V可调适用于各种中低变频器。

ADAPATABLE TO CONNECTIONS IN PARALLEL:It adopts a book-shape design and can be installed in parallel connection with zero clearance.it is recommended that up to 3 units can be connected in parallel.

可并联使用:采用书本型设计,可无间隙并联安装推荐最多3台并联使用。

## Product Model Description 产品型号说明



## Product Size 产品尺寸图

All dimensions in mm

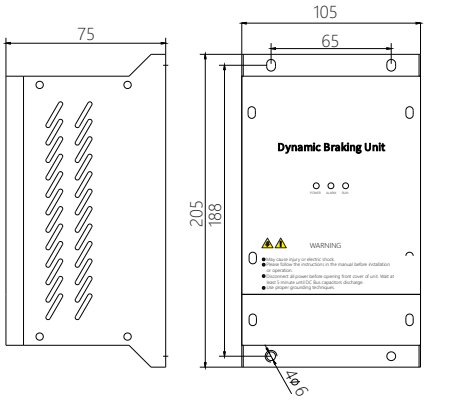



Fig. 1

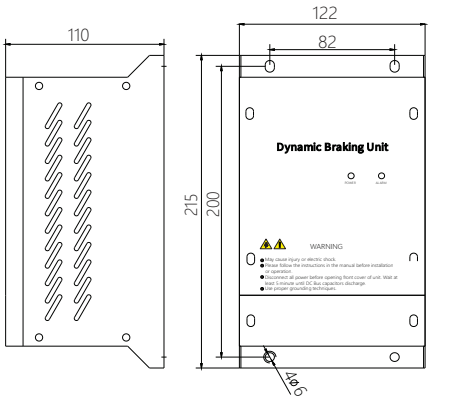



Fig. 2

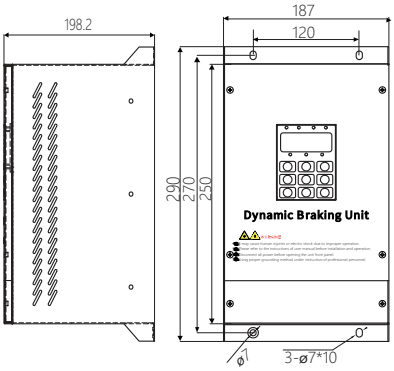



Fig. 3

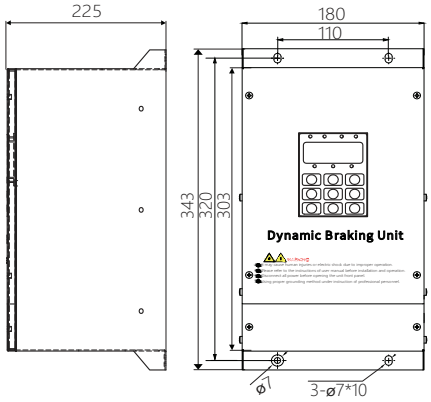



Fig. 4

## Selection Table 选型表

| Type<br>型号 | Inverter power<br>容量 | Voltage Grade<br>电压等级 | Peak current<br>峰值电流 | Default chopper Voltage<br>斩波电压预设值 | Braking torque<br>制动力矩 | Dimension Pic.<br>图号 | Terminal<br>端子 | Cable ($mm^2$)<br>配线 | Weight (kg)<br>重量 |
|---|---|---|---|---|---|---|---|---|---|
| TACG-4X01-0300 | 30kw | 400V | 50A | DC660V±5V (600-760V Adjustable) | 120% | Fig.1 | M4 | 6-8 | 1.5 |
| TACG-4X02-0550 | 45-55kw | | 75A | | 120% | Fig.2 | M4 | 6-8 | 2.5 |
| TACG-4X02-0750 | 75kw | | 100A | | 120% | Fig.2 | M4 | 10-16 | 2.5 |
| TACG-4X03-1100 | 90-110kw | | 150A | | 120% | Fig.3 | M5 | 10-16 | 5.2 |
| TACG-4X04-1100 | 55-110kw | | 150A | | 150% | Fig.4 | M8 | 10-16 | 8.5 |
| TACG-4X04-2000 | 132-200kw | | 200A | | 150% | | | 25-35 | 8.5 |
| TACG-4X04-2800 | 220-280kw | | 300A | | 150% | | | 25-35 | 8.5 |
| TACG-4X04-4500 | 315-450kw | | 450A | | 150% | | | 50-70 | 8.5 |

Warning:Units must never be mounted with the terminal area or base uppermost.
警告：不得将装置安装在端子区域或底座最上方。

# Dynamic Braking Resistor Calculation 选型公式

## Braking Resistor's Resistance Value:R

Braking Resistor's Resistance Value: $R=\frac{U_{dc}^{2}}{K\times P}C$

U dc²: Voltage value of chopper wave of inverter's braking circuit

K:Folds of braking torque 1.2-2.0

P:Frequency of the selected converter

Braking Resistor's power: Pr

Braking Resistor's power: $Pr=\frac{Po}{\Delta K}\quad\frac{P1\times(1-0.2)}{\Delta K}\times\eta$

Po: the power of electric motor

Δ K: folds of allow able transient operating over load. The exactvalue shall be determined by referring to the chart according to operating conditions.

P1: the average braking power that the system requires.

η: transminssion efficiency, The mechanical system of transmission provides braking damp corresponding to the effciency when it is funtioning.

0.2: the internal resistance consumes 20% braking energy.

## 制动电阻器的阻值：R

制动电阻的阻值：$R=\frac{U_{dc}^{2}}{K\times P}C$

U dc²: 所选变频器制动回路的斩波电压值

K：所需的制动转矩倍数1.2-2.0

P：所选变频器的功率

制动电阻器的功率：Pr

制动电阻器的功率：$Pr=\frac{Po}{\Delta K}\quad\frac{P1\times(1-0.2)}{\Delta K}\times\eta$

Po:电机的功率

ΔK:制动电阻器短时工作允许过负荷倍数，具体数据根据工况查图取值

P1:系统所需的平均制动功率

η:传动效率，传动的机械系统在制动时，提供与效率相应的制动阻尼

0.2:电动机的内阻消耗了20%的制动能量

ED brake ratio is the percentage of braking time based on a 100-second operating cycle.The selection of brake unit shall be carride out in acordance with brake current Udc/R and brake ration ED.
ED制动率以100S运行为一个周期，制动时间所占比率根据制动电流Udc/R与制动率ED选择制动单元

Overload Capability 电阻器允许过负荷倍数

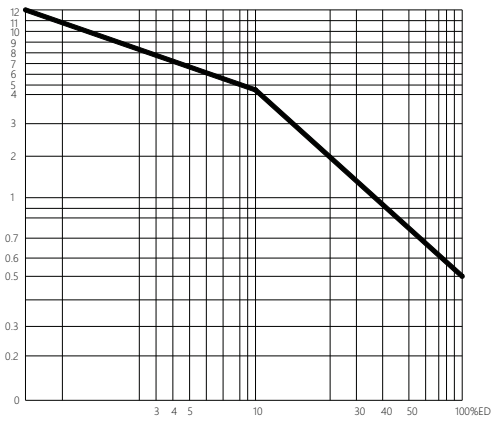
Overload Time 过载时间


Single Braking Times (S)
单次制动时间（秒）

Single Brake
单次制动

Overload Capability 电阻器允许过负荷倍数

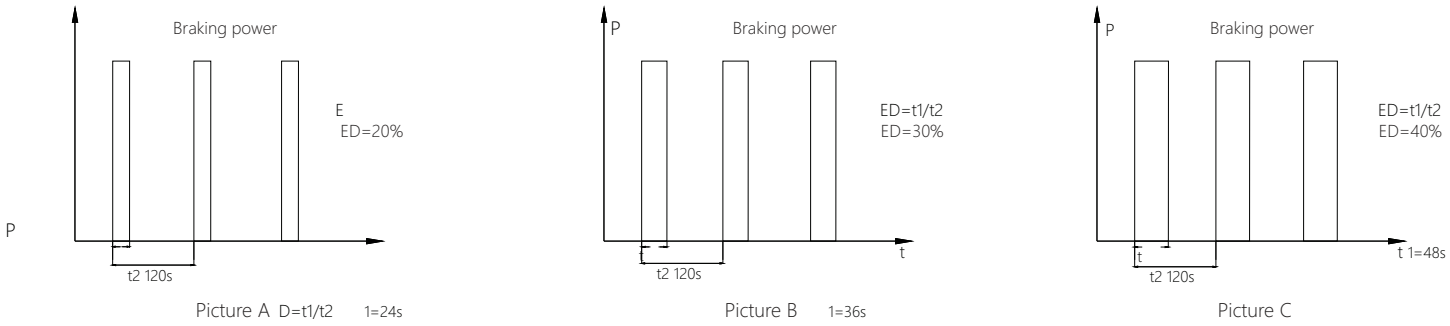
Overload Time 过载时间




Repeated Brake
重复制动

## EfPciency of duty (EU) 输出能效cle time=120S

C




Picture A D=t1/t2 1=24s

Picture B 1=36s

Picture C

P

t t

## How to select braking resistor to match braking unit 制动电阻选配表

ED ( 2

Braking chopper voltage= 660VDC,Apply to common machine and the elevator(less than 10 floors),crane trolley.
起始斩波电压VDC=660V，适用普通机械、10层以下电梯，起重机大小车选用。

| Inverter Power 变频器功率 (KW) | Type 制 | Quanity of Braking Unit 制 | Resisto r 电阻配置 | Quantity of Resistor 电 | Braking torque 制动力矩 | Usag e 使用率 | Resistance form 电阻形式 |
|---|---|---|---|---|---|---|---|
| 30 | TACG-4X01-0300 | 1 | 6000W/22Ω | 1 | 100% | 20% | Braking resistor box电阻箱 |
| 37 | TACG-4X02-0550 | 1 | 7500W/18Ω | 1 | 100% | 20% | Braking resistor box电阻箱 |
| 45 | TACG-4X02-0550 | 1 | 9000W/15Ω | 1 | 100% | 20% | Braking resistor box电阻箱 |
| 55 | TACG-4X02-0550 | 1 | 10KW/12Ω | 1 | 100% | 20% | Braking resistor box电阻箱 |
| 75 | TACG-4X02-0750 | 1 | 15KW/9Ω | 1 | 100% | 20% | Braking resistor box电阻箱 |
| 90 | TACG-4X03-1100 | 1 | 18KW/7.5Ω | 1 | 100% | 20% | Braking resistor box电阻箱 |
| 110 | TACG-4X03-1100 | 1 | 20KW/6Ω | 1 | 100% | 20% | Braking resistor box电阻箱 |
| 132 | TACG-4X04-2000 | 1 | 26KW/5Ω | 1 | 100% | 20% | Braking resistor box电阻箱 |
| 160 | TACG-4X04-2000 | 1 | 30KW/4.2Ω | 1 | 100% | 20% | Braking resistor box电阻箱 |
| 187 | TACG-4X04-2000 | 1 | 35KW/3.6Ω | 1 | 100% | 20% | Braking resistor box 电阻箱 |
| 200 | TACG-4X04-2800 | 1 | 40KW/3.35Ω | 1 | 100% | 20% | Braking resistor cabinet 电阻柜 |
| 220 | TACG-4X04-2800 | 1 | 45KW/3Ω | 1 | 100% | 20% | Braking resistor cabinet 电阻柜 |
| 250 | TACG-4X04-2800 | 1 | 50KW/2.68Ω | 1 | 100% | 20% | Braking resistor cabinet 电阻柜 |
| 280 | TACG-4X04-2800 | 1 | 55KW/2.4Ω | 1 | 100% | 20% | Braking resistor cabinet 电阻柜 |
| 315 | TACG-4X04-4500 | 1 | 60KW/2.12Ω | 1 | 100% | 20% | Braking resistor cabinet 电阻柜 |
| 350 | TACG-4X04-4500 | 1 | 70KW/2Ω | 1 | 100% | 20% | Braking resistor cabinet 电阻柜 |
| 400 | TACG-4X04-4500 | 1 | 80KW/1.68Ω | 1 | 100% | 20% | Braking resistor cabinet 电阻柜 |
| 500 | TACG-4X04-2800 | 2 | 100KW/1.35Ω | 1 | 100% | 20% | Braking resistor cabinet 电阻柜 |
| 630 | TACG-4X04-4500 | 2 | 130KW/1Ω | 1 | 100% | 20% | Braking resistor cabinet 电阻柜 |

ED 3

起始斩波电压VDC=660V，适用中等机械设备及20层以下电梯选用。Braking activation voltage= 660VDC,Apply to medium mechanical equipment and elevator(less than 20 floors).

| Inverter Power 变频器功率 (KW) | Braking Unit Type 制动单元型号 | Quanity of Braking Unit 制动单元数量 | Resistor 电阻配置 | Quantity of Resistor 电阻数量 | Braking torque 制动力矩 | Usag e 使用率 | Resistance form 电阻形式 |
|---|---|---|---|---|---|---|---|
| 30 | TACG-4X02-0550 | 1 | 9000Ω/18Ω | 1 | 120% | 30% | Braking resistor box电阻箱 |
| 37 | TACG-4X02-0550 | 1 | 11KW/15Ω | 1 | 120% | 30% | Braking resistor box电阻箱 |
| 45 | TACG-4X02-0550 | 1 | 13.5KW/12Ω | 1 | 120% | 30% | Braking resistor box电阻箱 |
| 55 | TACG-4X02-0550 | 1 | 16KW/10Ω | 1 | 120% | 30% | Braking resistor box电阻箱 |
| 75 | TACG-4X02-0750 | 1 | 22KW/7.5Ω | 1 | 120% | 30% | Braking resistor box电阻箱 |
| 90 | TACG-4X04-1100 | 1 | 27KW/6.2Ω | 1 | 120% | 30% | Braking resistor box电阻箱 |
| 110 | TACG-4X04-1100 | 1 | 33KW/5Ω | 1 | 120% | 30% | Braking resistor box电阻箱 |
| 132 | TACG-4X04-2000 | 1 | 40KW/4.2Ω | 1 | 120% | 30% | Braking resistor cabinet 电阻柜 |
| 160 | TACG-4X04-2800 | 1 | 48KW/3.5Ω | 1 | 120% | 30% | Braking resistor cabinet 电阻柜 |
| 187 | TACG-4X04-2800 | 1 | 55KW/3Ω | 1 | 120% | 30% | Braking resistor cabinet 电阻柜 |
| 200 | TACG-4X04-2800 | 1 | 60KW/2.8Ω | 1 | 120% | 30% | Braking resistor cabinet 电阻柜 |
| 220 | TACG-4X04-2800 | 1 | 65KW/2.5Ω | 1 | 120% | 30% | Braking resistor cabinet 电阻柜 |
| 250 | TACG-4X04-4500 | 1 | 75KW/2.3Ω | 1 | 120% | 30% | Braking resistor cabinet 电阻柜 |
| 280 | TACG-4X04-4500 | 1 | 85KW/2Ω | 1 | 120% | 30% | Braking resistor cabinet 电阻柜 |
| 315 | TACG-4X04-4500 | 1 | 95KW/1.8Ω | 1 | 120% | 30% | Braking resistor cabinet 电阻柜 |
| 350 | TACG-4X04-4500 | 1 | 105KW/1.6Ω | 1 | 120% | 30% | Braking resistor cabinet 电阻柜 |
| 400 | TACG-4X04-2800 | 2 | 120KW/1.4Ω | 1 | 120% | 30% | Braking resistor cabinet 电阻柜 |
| 500 | TACG-4X04-4500 | 2 | 150KW/1.2Ω | 1 | 120% | 30% | Braking resistor cabinet 电阻柜 |
| 630 | TACG-4X04-4500 | 2 | 190KW/0.9Ω | 1 | 120% | 30% | Braking resistor cabinet 电阻柜 |

E 40%

Braking activation voltage= 660VDC,Apply to more than 30 floors elevators, main hook choice of the light crane.
起始斩波电压VDC=660V，适用30以上电梯，轻型起重机主构选用。

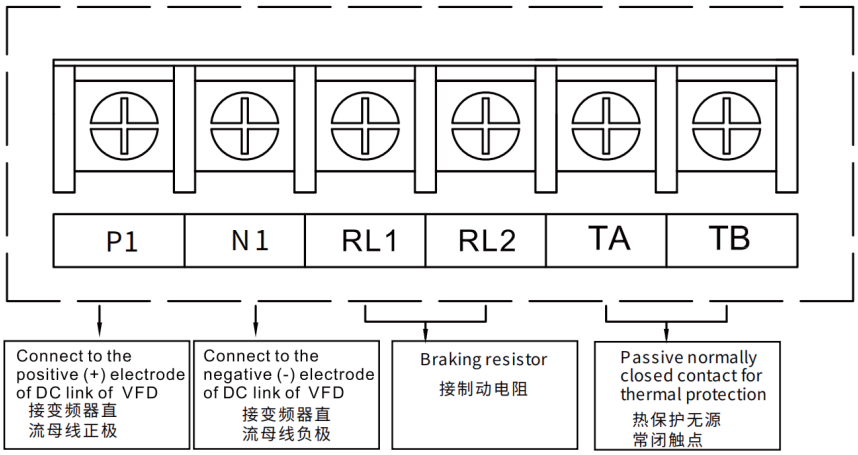
| Inverter Power 变频器功率 (KW) | Braking Unit Type 制动单元型号 | Quanity of Braking Unit 制动单元数量 | Resistor 电阻配置 | Quantity of Resistor 电阻数量 | Braking torque 制动力矩 | Usag e 使用率 | Resistance form 电阻形式 |
|---|---|---|---|---|---|---|---|
| 30 | TACG-4X02-0750 | 1 | 12KW/15Ω | 1 | 150% | 40% | Braking resistor box电阻箱 |
| 37 | TACG-4X02-0750 | 1 | 15KW/12Ω | 1 | 150% | 40% | Braking resistor box电阻箱 |
| 45 | TACG-4X03-1100 | 1 | 18KW/9.9Ω | 1 | 150% | 40% | Braking resistor box电阻箱 |
| 55 | TACG-4X04-1100 | 1 | 22KW/8.1Ω | 1 | 150% | 40% | Braking resistor box电阻箱 |
| 75 | TACG-4X04-1100 | 1 | 30KW/6Ω | 1 | 150% | 40% | Braking resistor box电阻箱 |
| 90 | TACG-4X04-1100 | 1 | 36KW/5Ω | 1 | 150% | 40% | Braking resistor box电阻箱 |
| 110 | TACG-4X04-2000 | 1 | 45KW/4.1Ω | 1 | 150% | 40% | Braking resistor cabinet 电阻柜 |
| 132 | TACG-4X04-2800 | 1 | 55KW/3.4Ω | 1 | 150% | 40% | Braking resistor cabinet 电阻柜 |
| 160 | TACG-4X04-2800 | 1 | 65KW/2.8Ω | 1 | 150% | 40% | Braking resistor cabinet 电阻柜 |
| 187 | TACG-4X04-2800 | 1 | 75KW/2.4Ω | 1 | 150% | 40% | Braking resistor cabinet 电阻柜 |
| 200 | TACG-4X04-4500 | 1 | 80KW/2.3Ω | 1 | 150% | 40% | Braking resistor cabinet 电阻柜 |
| 220 | TACG-4X04-4500 | 1 | 90KW/2.1Ω | 1 | 150% | 40% | Braking resistor cabinet 电阻柜 |
| 250 | TACG-4X04-4500 | 1 | 100KW/1.8Ω | 1 | 150% | 40% | Braking resistor cabinet 电阻柜 |
| 280 | TACG-4X04-4500 | 1 | 110KW/1.6Ω | 1 | 150% | 40% | Braking resistor cabinet 电阻柜 |
| 315 | TACG-4X04-2800 | 2 | 130KW/1.4Ω | 1 | 150% | 40% | Braking resistor cabinet 电阻柜 |
| 350 | TACG-4X04-2800 | 2 | 140KW/1.28Ω | 1 | 150% | 40% | Braking resistor cabinet 电阻柜 |
| 400 | TACG-4X04-4500 | 2 | 160KW/1.15Ω | 1 | 150% | 40% | Braking resistor cabinet 电阻柜 |
| 500 | TACG-4X04-4500 | 2 | 200KW/0.9Ω | 1 | 150% | 40% | Braking resistor cabinet 电阻柜 |
| 630 | TACG-4X04-4500 | 3 | 260KW/0.72Ω | 1 | 150% | 40% | Braking resistor cabinet 电阻柜 |

Note:The yard lifting equipment of port and whart is in a state of high frequency use,its conPguration is matched according to ED=60%~80%,specipic conPgurati on contact to our company please.
备注：港口、码头货场起重设备处于高频率使用状态，其配置要按ED=60%~80%选配，具体配置情况请与我公司联系。

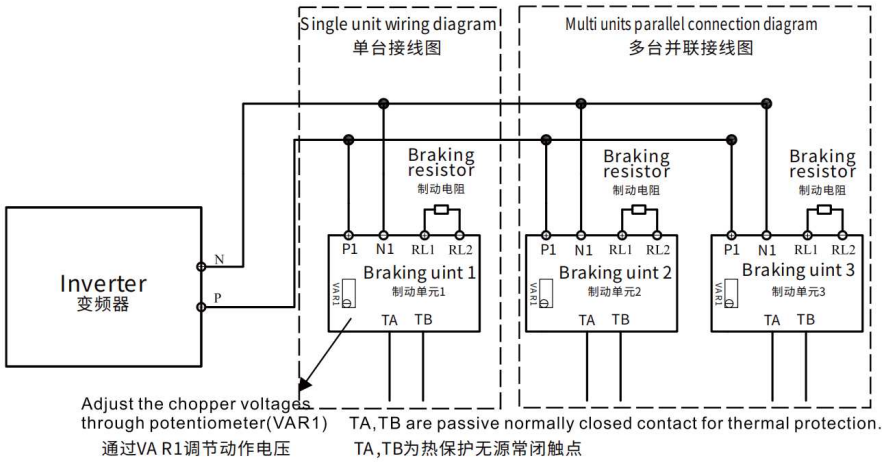
# Installationand wiring 安装和接线

## Internal terminals and wiring diagrams 内部端子接线示意图

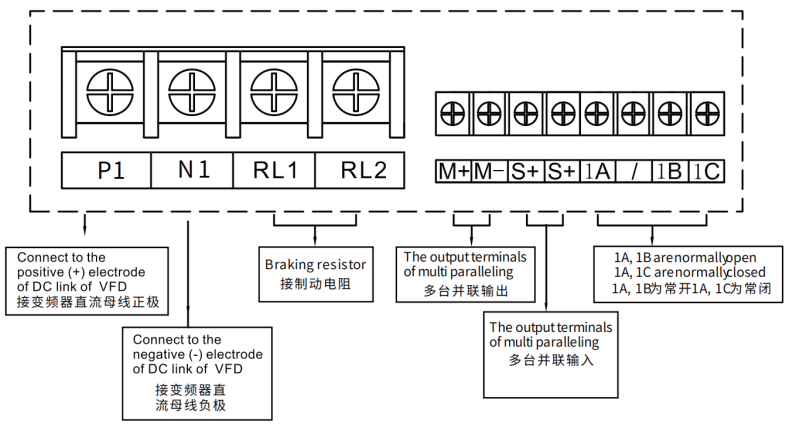
Terminals内部端子示意图（for: TACG-4X01-0300)



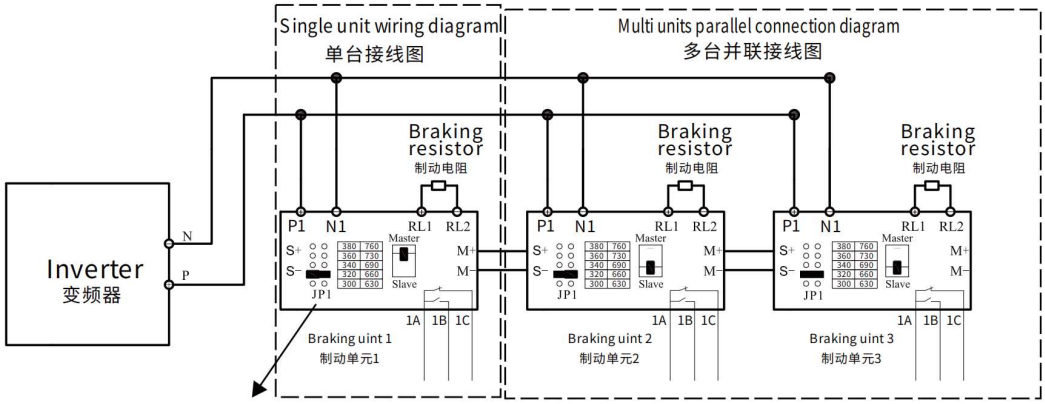

Wiring diagram 接线示意图（for: TACG-4X01-0300)




Terminals内部端子示意图（for: TACG-4X02-0550，TACG-4X02-0750)



Wiring diagram 接线示意图 (for:TACG-4X02-0550,TACG-4X02-0750)

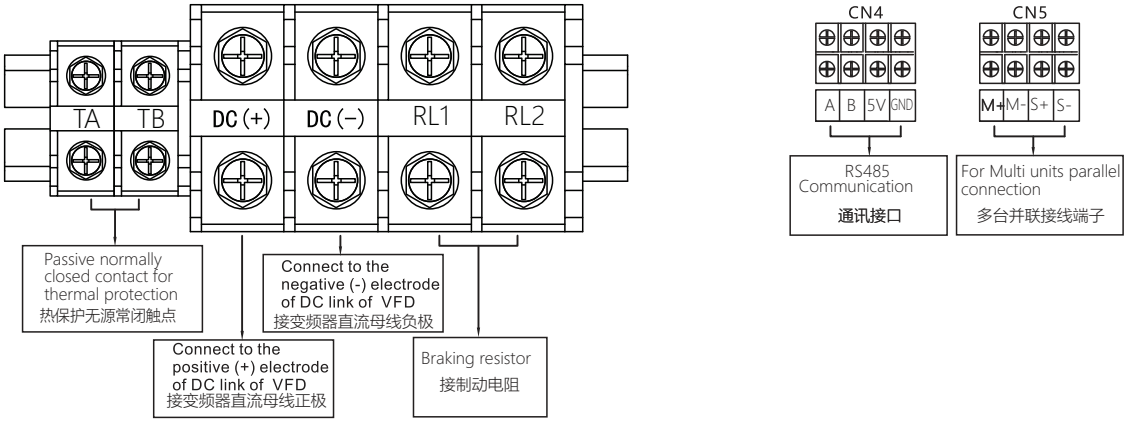



Adjust the chopper voltages through jump line(JP1)
可通过**JP1**调节动作电压

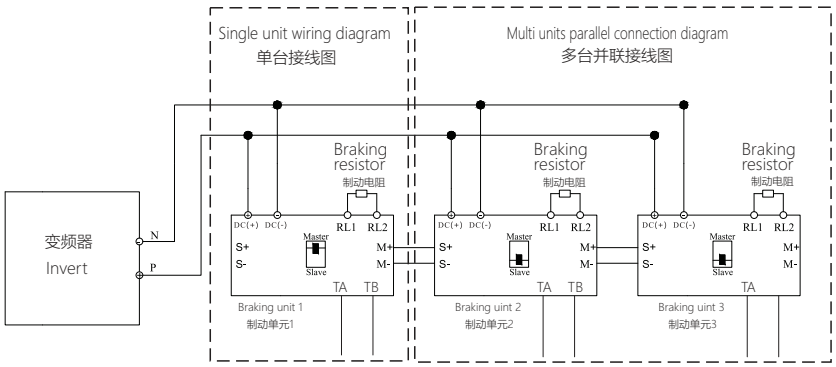
1A, 1B are normally open; 1A, 1C a re normally closed.
1A,1B为常开;1A,1C为常闭

During multi units parallelling, please connect the master-slave synchronous signal lines well, then place the 2 and N pin of braking units to the SLAVE position.
多台并联时连接好主、从之间的同步信号线后将制动单元2至制动单元N插针放在SLAVE位置上。

Terminals内部端子示意图 (for:TACG-4X03-1100,TACG-4X04-1100,TACG-4X04-2000,TACG-4X04-2800,TACG-4X04-4500)




Wiring diagram 接线示意图(for:TACG-4X03-1100,TACG-4X04-1100,TACG-4X04-2000,TACG-4X04-2800,TACG-4X04-4500)




TA,TB are Passive normally closed contact for thermal protection
TA,TB为热保护无源常闭触点

During multi units parallelling, please connect the master-slave synchronous signal lines well, then place the 2 and N pin of braking units to the SLAVE position.
将制动单元2至制动单元N插针放在SLAVE位置上。

## Safety precautions & installation environment 安全事项和安装环境

### Safety 安全

Braking unit are working at high DC voltage, wrong operation & installation may cause human injure and poverty loss.
制动单元所连接的设备都都工作在直流高压状态。错误的操作和不当的安装使用都可能危害生命安全或导致财产损失。

When doing installation and wiring,do cut o ffthe power supply of VFD and WAIT 5 ~10 MINUTES,when the VFD build in capacitors have been fully discharged !Please check the red LED of VFD, when it's on means capacitor discharging not finish, operation not allowed.
安装和接线时，必须把与其相连接的变频器和主电源断开，并等待5-10分钟，变频器内部电容放电完毕时方可操作。请注意变频器的红色LED灯，指示灯亮时，表示内部放电未完成，不可操作。

### Heat radiation 散热

Braking unit generative heat when working,should be away from explosive flammable item.Proper ventilation space should be left for radiation, minimum size, 100mm up & down, 30mm left & right.
制动单元工作时会产生热量，其周围不应放置易燃，易爆物品。用户安装时一定要考虑通风。安装最小通风空间:上下100mm，左右30mm。

Please install the unit on the metal board, when more than two Braking unit installed in one control cabinet,please install cooling fan and make sure air inlet temperature ≤+40℃.
请将制动单元安装在金属等不易燃烧材料制成的底板上。在同一控制柜内，安装使用2台以上的制动单元时请设置冷却风机，并应保证进气口空气的温度≤+40℃。

### Grounding 接地

Ground connection is to prevent damage due to current leakage and malfunction and reduce interfere between equipment.
接地是为了防止设备漏电或故障时对人身可能产生的危害，同时也可减小设备之间的干扰。

### Cable 配线

Insulation grade and cross-section that meet the standard. Flexible cables have better flexibility, because the cables may be in contact with high-temperature equipment,Suggest using Heat-resisting flexible cable or flame-retardant cable.
要求使用绝缘等级和截面都满足标准的电缆。软电缆有更好灵活性，因为电缆可能的高温设备有接触，建议使用耐热软电缆或阻燃电缆。

### Protection 防护

Please add over heat protection device for the load resistor when installing Braking unit, in case IGBT problem create high current and damage the VFD or cause fire danger.
制动单元的负载电阻要增加热保护设置，以防制动单元IGBT击穿电阻长期工作而产生高温，有火灾危险。

### Environment Requirement 环境要求

This device will have best performance & service life under below condition.
本设备在指定的使用条件下有最好的使用效 和最长的使用寿命。
Indoor Aplication 室内使用
+14°F to 104°F (-10℃ to+40℃)No Frost; Humidity 90%RH. - 10℃ ~ +40℃ 不结露; 相对湿度90%RH。
Vibration 1G at 10-20Hz, 0.2G at 20-50Hz. 振动1G at 10-20Hz, 0.2G at 20-50Hz。
No solids;No corrosive gas; No metal powder. 不可有异物进入； 不可有腐蚀气体;不可有金属粉尘。
This device is NOT EXPLOSION PROOF IP20 protection class . 本设备不具备防爆性能;防护等级IP20。

## Operation Instruction 操作说明

Check cable wiring before power on (wrong wiring for +&-may cause damage to Inverter and braking unit ) Check if terminals are fixed tightly.
通电前检查接线是否正确(正负极接错时可能会损坏变频器及制动单元) 检查接线端子, 请勿有松动现象;

Pls ref diagram above for parallel connection , after connect the signal cable between master unit and slave unit , pls put the N pin at SLAVE position of the Unit 2.
制动单元并联使用时请参照接线图, 连接好主、从之间的同步信号线后, 将制动单元2至制动单元N插针放在SLAVE位置上;

Do not touch the Braking unit after power on , high voltage shock risk!
通电后请勿触摸制动单元内部器件及负载电阻, 注意高压。

Reference table for choppervoltage range of our braking unit.
不同额定电压等级的机型动作电压设置范围见下表:

| Voltage grade<br>电压等级 | Default chopper voltage<br>动作电压预设值 | Chopper voltage range<br>动作电压设定范围 |
|---|---|---|
| 400V | DC660V±5V | 600-760V |

## Setting method for the chopper voltages of braking units without keyboard
## 不带控制面板的制动单元动作电压设置方法

When products are out of factory.the chopper yoltages are set to the suitable values,it is unnecessary to modify the values in case of normal working situation.
制动单元在出厂前, 动作电压已经调整为 适的值。无特殊情况无须再调整动作电压的值。

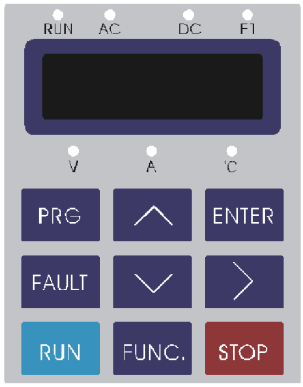
To set chopper voltage , pls remove panel controller , braking unit has five working range (300/630V,320/660V,340/690V,360/730V,380/760V ),put the pin at the closed position to your power grid ( default set 320/660V).
要设置斩波电压, 请 除控制器面板, 制动单元有五个工作范围(300/630V、320/660V、340/690V、360/730V、380/760V) , 将引脚放在关闭位置到您的电网( 默认设置为 320/660V)。

It is needed to remove the front panel of braking units first, then to adjust the chopper voltages through potentiometer(VAR1) or jump line(JP1)on the control panel.
如需要调整动作电压可以 除制动单元面板.通过控制板上的电位器(VAR1)或跳线(JP1)调整动作电压;

## Keyboard function illustration.Only forbraking units with keyboard
## 带控制面板的制动单元操作说明

状态指示灯说明

| Light 指示灯 | Function 作用说明 |
|---|---|
| DC | Running status monitoring<br>运行监控状态指示，表示当前为运行监控状态 |
| V | Data checking status<br>参数查看状态指示，表示当前为参数查看状态 |
| AC | Device ready for work<br>工作允许指示，此灯亮表示设备准备就绪 |
| RUN | Device running<br>工作状态指示，此灯亮表示当前处于工作状态 |
| A | Device fault,running problem<br>故障状态指示，此灯亮表示存在运行异常 |
| F1 | Keyboard lock<br>键盘锁定指示，此灯亮表示当前键盘被锁定 |




控制面板

## LED display illustration LED显示说明

Different codes will show to indicate current status.
键盘上显示不同的代码以指示当前状态。

## Keyboard button illustration 按键功能说明

| Button 按键 | Function 按键功能 |
|---|---|
| PRG | Shift between "Running monit oring" "data checking"status,hold button for2 sec for status display<br>用于在"运行监控"、"参数查看"两种显示状态之间进行循环切换。持续按下该按键两秒钟可以复位显示状态 |
| ▲ | To add value of the parameter,hold to increase continuously<br>参数修改状态时增加参数值，按下不放时可以连续动 |
| ▼ | To reduce value of the parameter,hold to decrease continuously<br>参数修改状态时减小参数值，按下不放时可以连续动 |
| ENTER | Read or save set data<br>读取或保存设定参数 |
| FAULT | Page turning forward,hold for continuously<br>向前对参数进行翻页，持续按下时可以持续动作 |
| RUN | Page turning backward,hold for continuously<br>向后对参数进行翻页，持续按下时可以连续动作 |
| STOP | When device malfunction,press button for restart<br>存在运行异常时按下该键可以使设备重新启动 |
| FUNC. | Function 1:Hold2 sec. for locking and unlocking the keyboard;function 2: changing parameter when setting. 持续按下两秒锁定或解锁键盘;设置参数时按下可以切换编辑位 |

## Common keyboard operation 常用键盘操作

| Operation 操作种类 | Method 操作方法 |
|---|---|
| Shift display status<br>切换显示状态 | Press "PRG"<br>每按一次"PRG"键, 当前键盘的显示状态切换一次 |
| Change monit or item<br>切换监控项目 | Press" FAULT"or"RUN" to change<br>在监控显示状态下按"FAULT"或"RUN"键向前或向后翻页 |
| Read monit or item data<br>读取监控项目 | Monitor status,after data changed,system will show current data after one sec.Press"ENTER"to review current data immediately to cross check with setting data<br>监控显示状态下, 当改变当前监控的参数后, 程序显示当前参数号一秒后自动显示相应监控参数的内容。在此之前如　按下ENTER"键则可以立即显示当前监控参数内容 |
| Review data<br>切换设置参数 | Press" FAULT"or"RUN"during data view status<br>在参数查看显示状态下按"FAULT"或"RUN"键向前或向后改变当前参数号码 |
| Read setting data<br>读取设置参数 | Press" ENTER" during data setting page<br>在参数设置显示状态下按" ENTER"键 |
| Change setting parameter<br>修改设置参数 | During parameter setting status press"ENTER",data will flash press"▲"or"　▼"to change value,press "FUNC. can change flash position to edit.After finish editing, press"ENTER" to save.<br>在参数设置显示状态下再次按下"ENTER"键, 所显示的相应参数的数据最后一位会闪烁, 此时按下"▲"或键" ▼ "可以更改功能参数的值, 按下"FUNC."键时可以切换当前的闪烁编辑位, 数据修改完成后再次按下"ENTER"键可以保存所设置的功能参数。 |
| Save setting<br>保存设置参数 | Press" ENTER" during setting status<br>参数编辑状态下按下"ENTER"键 |

## Monitor data illustration 监控参数说明

| Code 监控编号 | Units 单位 | Monitor content 监控内容 |
|---|---|---|
| C1000 | V | Current DC input voltage　显示当前制动单元输入直流电压 |
| C1001 | ℃ | Current temperature inside unit 显示当前制动单元内部温度 |

## Setting data illustration 设置参数说明

| Code 参数号 | Function 功能 | Unit 单位 | Range /default value<br>设置范围/默认值 | Change 修改 |
|---|---|---|---|---|
| D1000 | Voltage 电压等级 | V(AC) | Depending on model随机型而定 | N/A 不允许 |
| D1001 | Chopper voltage 动作电压 | V(DC) | Depending on model随机型而定 | Allowed 允许 |

NOTE: Default chopper voltage and Chopper voltage range see the table on page 12.

注：默认斩波器电压和斩波器电压范围见第12页的表格。

## Example of keyboard operation(setting chopper voltage )
## 键盘操作示例（动作电压的设置）

Press FUNC.and hold 2 sec.(Unlock the keyboard,F1 indicator goes o ff) → Press PRG ( display C1000 ) → Press PRG again ( display D1000 ) → Press FAULT ( display D1001 ) → Press ENTER ( display default chopper voltage ) → Press ▲or ▼( modify chopper voltage ) → Press ENTER ( Save the setting ) → Press PRG ( Display the current bus voltage ) → Press FUNC.and hold 2 sec. ( Lock the keyboard ) .

动作电压设置步骤:

按FUNC.键2秒钟（解锁键盘, F1指示灯熄灭) → 按PRG键(显示C1000) → 再按PRG键(显示D1000) → 按按FAULT键(显示D1001) → 按ENTER键(显示动作电压, 默认660V) → 通过按键 ▲ 或▼ 修改动作电压后 → 按ENTER键(保存动作电压设置) → 按PRG键(显示当前母线电压) → 最后按FUNC.键2秒钟(锁键盘)。

## Wiring matters 接线注意事项

Threading method 穿线方法

Lead wire should be through the hole on the bottom of the Braking unit.

导线应从制动单元底部的穿线孔中穿入。

Unit isolation from signal line 信号线的隔离

Because of harmonic and noise created by unit, the DC side cable should be stranded to reduce radiation and inductance. Signal cable nearby should be shielded.

由于制动单元与制动电阻边线上有较强的噪声分量, 必须直流侧电缆进行绞 , 减少辐射和电感, 其周围抗噪声较弱的信号线应进行屏蔽。

Wire connection distance 接线距离

The cable between VFD and Braking unit should less than 5 Meters,Enclosure(aluminum radiator)should be grounded properly.

制动单元和变频器之间的接线距离不要大于5米, 制动单元和制动电阻之间距离不大于10米。外壳(铝散热器)要保持良好的接地。

## Faults & Solutions 故障及对策

Problem 1: Braking unit power light is on,but braking unit is not working.

电源指示灯亮, 制动单元不工作。

Solution: Please remove control panel,check if the Pin position on MASTER (for single usage, must put on MASTER position).

请 开操作面板, 检查是否选择MASTER插针(单台使用时必须将插针置于MASTER位置)

Problem 2: When braking unit not working,resistor temperature very high.

制动单元不处于工作状态时, 负载电阻出现超高温。

Solution: IGBT of the braking unit is broken,pls change new braking unit.

可能是制动单元内部IGBT击穿, 请更换制动单元。