

Application Note

AN-ODP-17

## ***How to enable and use the braking circuit***

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- **General**

Optidrive Plus has a built-in braking (power dump) circuit (except size 1 drives), which is used with an external braking resistor in order to dump the re-generated energy from the motor that results from deceleration.

A braking resistor is generally needed for applications that need a faster deceleration rate or have high load inertia.

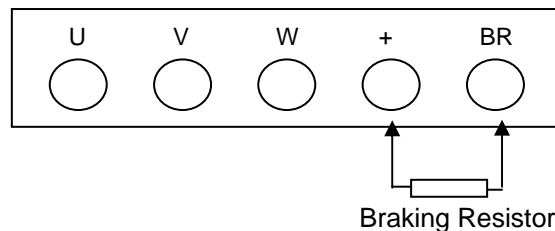
This document describes how to connect the braking resistor to the Optidrive Plus and how to enable the brake circuit inside the drive.

For advice on how to select the correct braking resistor, please refer to AN-ODP-37 for more information

- **Connection:**

See diagram below for correct connection of the brake resistor:

*Optidrive Plus Power Connection Terminal*



***Drive must be powered down before install the resistor in case electrical shock. See user guide for more safety information.***

When connecting a braking resistor, it is important that the minimum permissible resistance value is observed. Refer to the User guide rating tables for recommended resistance values.

A range of specially developed braking resistors are available from Invertek which have the following advantages:

- Mounts to side of Optidrive heatsink – optimum cooling, needs no enclosure space
- Thermal overload protection in Optidrive
- In-built thermal fuse for secondary level protection.

The resistor should be connected to the drive as shown in the above diagram.

Note that two or more resistors can be connected in parallel, provided the minimum resistance value remains to be observed.

- **Parameters:**

**P2-23 Brake circuit enable**

This parameter controls the functionality of the brake circuit.

- P2-23=0: brake circuit is disabled. The brake transistor inside the drive will not activate even if the drive is in a regeneration condition.
- P2-23=1: The brake circuit is enabled and the braking resistor overload protection function is also enabled. This is the low power setting and should be used for the standard range of braking resistors available from Invertek.  
The protection level is set at 200W per brake resistor for S2 and S3 drives and 500W per resistor for S4, S5 and S6 drives.
- P2-23=2: The brake circuit is enabled and the braking resistor overload protection function is also enabled. This is the high power setting and should be used for specific custom resistors. The protection level is set at 1kW per brake resistor for S2 and S3 drives and 2kW per resistor for S4, S5 and S6 drives.
- P2-23=3: The brake circuit is enabled but without braking resistor overload protection function. This setting should be used for applications that need a braking power that exceeds that when P2-23 = 2.

Note that the software protection works correctly for parallel connection of the braking resistors. If two parallel resistors are used, the braking power available is doubled. The software protection automatically configures itself for this, resulting in the protection level being increased accordingly.

- **Special function:**

For drive firmware revision V2.21 or later, the braking control parameter has an extra function which is used to enable the self warm-up function when drive in under temperature condition.

When P2-23 > 0 (brake circuit enabled) and the drive is in an under temperature trip condition (drive temperature below 0°C), the drive will automatically enable the braking channel in order to warm up the drive. Once the drive temperature exceeds 0°C (minimum operating temperature), the braking circuit will be disabled. If an enable signal is present, the drive will clear the under-temperature trip, enable and run automatically.

Note that this function needs a braking resistor to be fitted to the drive.

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