

DBx Module



The DBx Module is a performance-enhancing series-connected add-on module for MagnaDC programmable DC power supplies, delivering ultra-high stability, low ripple, high precision and high accuracy, with voltage, current, and power control modes. The combination of the two products provides a broad range of magnet power supply solutions for high-energy physics and medical applications, including driving dipole, quadrupole, and steering magnets, as well as powering coils XS IW XEFPMWL W XEFPI QEKRIXMG ¼ IPHW coupled with the high accuracy and low ripple characteristics make the combined solution ideal for ATE calibration applications.

0S[6MTTPI 4IVJSVQERGI

8LI (&\ 1SHYPI 'SR¼KYVEXMSR % YXMPM^IW XLVI suppress differential line-to-line EMI, common-mode line-to-ground EMI, and power supply ripple from the DC bus.

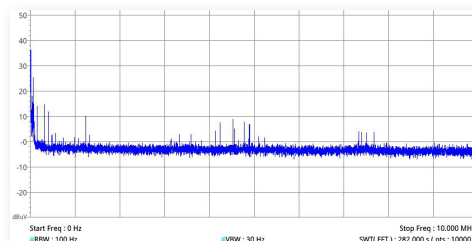
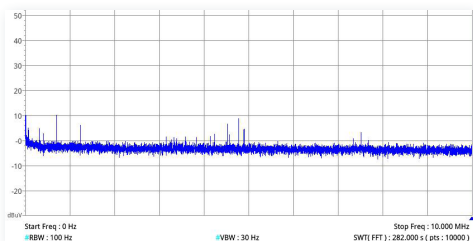
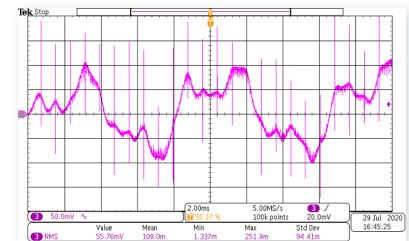
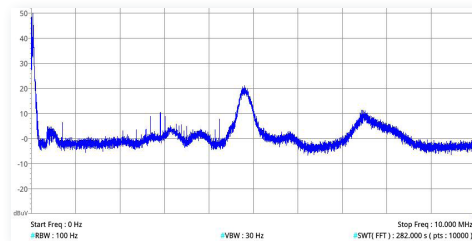
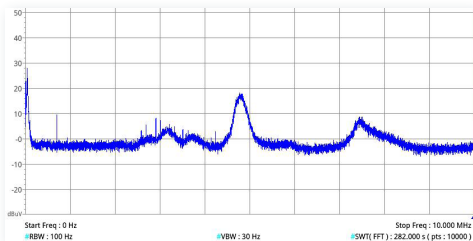
-RXIVREPP] JEFVMGEXIH GSQQSR QSHI ERH HMJ EVI MRXIKVEXIH MR XLI (&\ 1SHYPI 'SR¼KYVEXMSR loss as high as 62 dB; typical results shown in the table below.

8S ¼PXIV TS[IV WYTTTP] SYXTYX VMTTPI ZSPXEKI 'SR¼KYVEXMSR % YXMPM^IW E PMRIEV VIKYPEXSV can extend down to the mains power frequency, the DBx Module across a series-pass power semiconductor.

The regulator requires two feedback loops: one to maintain a 1.25 Vdc drop across the linear regulator and the second to produce a AC ripple canceling voltage across the series-pass power semiconductor, equal and opposite of the AC ripple voltage at the input. Adding a series connected diodes across the regulator provides protection for current surging and overvoltage transients—a weak point in conventional linear regulators.

Insertion Loss Measurements

Frequency (MHz)	0.05	0.15	0.50	1.0	10.0	30.0
(M J J I V I R X M E P 41.6 H 58.7 & 46.3	41.6	58.7	46.3	62.7	55.1	50.5
Common Mode (dB)	30.0	47.0	57.4	67.6	56.4	25.4



Key Facts

- Add-on module for MagnaDC power supplies
- Available from 1.5 kW to 3,000 kW+
- < 5 ppm stability
- Up to 24-bit resolution
- Up to 10x output ripple reduction
- Current ratings up to 6,000 Adc
- Voltage ratings up to 1,000 Vdc
- Voltage, current, and power control

Ultra-Stable, High Accuracy, and High Resolution

% R YPXVE W XEFPI ½Y\KEXI H MVIGX GYVVIRX GY is used to take high accuracy isolated measurements from a series connection with the power supply's DC output. This ultra-stable transducer, combined with the DBx Module's low temperature drift resistors and temperature stabilized digital programming circuit, provides highly granulated programming (18-bit) and readback (24-bit), and enables long-term stability less than 5 ppm. Critical components are carefully laid out within a specially designed temperature compartment to accelerate the time to temperature stabilization.

Setup and Control

bars with threaded inserts for the DC input and DC output connections. -R XLIWI GSR¼KYVEXMSRW XLI (' TS[IV WYTTTP] DBx Module's DC input and all current sensing is done internal to the DBx Module. The zero-drift bridge under test is connected to the external DCCT with a control signal providing feedback to the DBx Module. The zero-drift bridge under test is connected to the DBx Module's DC output via a provided cable connects the DBx Module's interface connector to the power supply's JS1 37-pin external user I/O connector.

Digital programming of set points, trip points, and slew rates are performed using the DBx Module via front panel knob or keypad, front panel up-down arrows for highly granual single-bit control, or using the computer interface connections via provided MagnaWEB software or YWIV HI¼RIH WSJX[EVI YWMRK 7'4- GSQQRHW interfaces include RS485 and USB with optional TCP/IP Ethernet.



DBx Module rear view with DC input and DC output covers removed

'SR¼KYVEXMSRW

8LI (& \ 1SHYPI MW SJJIVIH MR XLVII HMJJIVIRX GSR¼KYVEXMSRW, % & 4IVJSVQERGI 7TIGM¼GEXMSRW and C1—differing in maximum current capability and internal stages.

The DBx Module **Configuration A1** contains all stages, including XLI PMRIEV VIKYPEXSV HMJJIVIRXMEP ERH GSC temperature-stabilized ultra-high stability controller, and DCCT.

'SR¼KYVEXMSR % SGGYTIW E 9 % LMKL VEGO QSYRX I is available for voltages from 10 Vdc to 1,000 Vdc and three different max current ratings, at 75 Adc, 150 Adc, and 225 Adc.

The DBx Module **Configuration B1** is intended for applications XLEX HS RSX VIUYMVI EHHXMSREP ('¼PXIVMRK temperature-stabilized ultra-high stability controller and DCCT.

'SR¼KYVEXMSR & SGGYTIW E 9 VEGO QSYRX I for voltages from 10 Vdc to 1,000 Vdc and three different max current ratings, at 75 Adc, 150 Adc, and 225 Adc.

The DBx Module **Configuration C1** is intended for high-current applications, where the 1U rack-mount enclosure contains only the temperature-stabilized ultra-high stability controller, with a provided external DCCT that ties into the DBx Module through a rear connector. 'SR¼KYVEXMSR ' MW EZEMPEFPI JSV ZSPXEKIW max current ratings from 300 Adc to 6,000 Adc.

%ZEMPEFPI 'SR¼KYVEXMSRW

Config	EMI/Ripple Filter	High Stability, Precision, Accuracy	Max Voltage Rating Available	Max Current Rating Available	Form Factor
A1	✓	✓	10 Vdc to 1,000 Vdc	75 Adc, 150 Adc, or 225 Adc	1U Enclosure
B1	✗	✓	10 Vdc to 1,000 Vdc	75 Adc, 150 Adc, or 225 Adc	1U Enclosure
C1	✗	✓	10 Vdc to 1,000 Vdc	300 Adc to 6,000 Adc	1U Enclosure + External Transducer

Model Ordering Guide

(& \ 1SHYPI QSHIPW EVI HI¼RIH FJ XLI GSR¼KYVE WII %ZEMPEFPI 'SR¼KYVEXMSRW XEFPI XLI C and the maximum current rating. Any voltage from Magna-Power's standard MagnaDC power supply offering is available, from 10 Vdc to 1,000 Vdc. The DBx Module resolution step size and calibration is a function of its maximum ratings, therefore it's recommend to specify a model most closely matched to the requirement.

DBx-A1-200-225/UI+LXI



(& \ 1SHYPI VMKLX WMHI ZMI[XST ERH PIJX W

7TIGM¼GEXMSRW

GSR¼KYVEXMSRW, % & 4IVJSVQERGI 7TIGM¼GEXMSRW

Stability Voltage Control	< 5 ppm; long-term drift (8 hr)
Stability Current Control	< 5 ppm; long-term drift (8 hr)
Temperature Control	±0.05 ppm/°C
Programming Resolution	18-bit
Measurement Resolution	24-bit
Programming Accuracy	±0.04%; voltage control ±0.04%; current control
Power Loss Configuration A1 Only	Current output x 1.5 volts
Warm-up Time	45 min

'SRRIGXMSR 7TIGM¼GEXMSRW

AC Input 1Φ, 2-wire + ground	IEC 60320 connector
AC Input 3Φ, 3-wire + ground	Molex 38660 connector
DC Input	Bus bars with 3/8" threaded insert; 250 Adc max
DC Output	Bus bars with 3/8" threaded insert; 250 Adc max
Communication - RXIVJEGIW 7 XLSB Host (Front)	USB Host (Front): Type B
	USB Host (Rear): Type B
	RS485 Rear: RJ-45
	External User I/O: 25-pin D-Sub, female
Communication - RXIVJEGIW 3 TXMSREP	Ethernet (Rear): RJ-45

4L]WMGEP 7TIGM¼GEXMSRW

Size and Weight Configuration A	1U
Configuration B	1.75" H x 19" W x 24" D (4.4 x 48.3 x 61.0 cm)
	35 lbs (15.88 kg)
Size and Weight Configuration C	1U (See Above) + External Transducer
	External transducer size and weight will vary depending on current rating

)RZMVSRQIRXEP 7TIGM¼GEXMSRW

Ambient Operating Temperature	0°C to 50°C
Storage Temperature	-25°C to +85°C
Humidity	Relative humidity 30% to 90%, non-condensing
Air Flow	Side intake, rear exhaust

Regulatory Compliance

EMC	Complies with 2014/30/EU (EMC Directive) CISPR 22 / EN 55022 Class A
7 E J I X]	Complies with EN61010-1 Complies with 2014/35/EU (Low Voltage Directive)
CE Mark	Yes

RoHS Compliant Yes

Note: 7TIGM¼GEXMSRW QIEWYVIH EX JYPP PSEH 7TIGM¼GEXMSRW