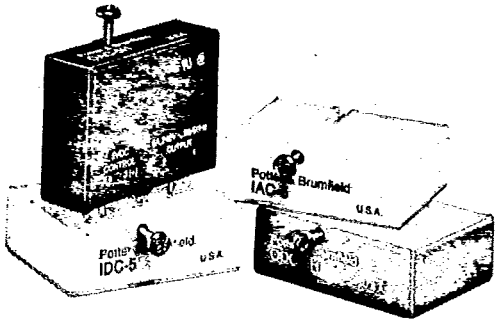
POTTER & BRUMFIELD INPUT/OUTPUT MODULES

T-52-13-35

ENHANCED PERFORMANCE



IAC/OAC
IDC/ODC

INPUT/OUTPUT MODULES
MOLDED CONSTRUCTION

File E22575 & E29244
File LR15734

FEATURES

- **OAC types-up to 6 Amps**
- **ODC types-up to 5 Amps**
- Industry standard package and pin-out
- Color coded by function
- 4,000V rms optical isolation
- High immunity to false operation
- Series compatible
- Output modules can be controlled from sinking or sourcing logic
- Meets VDE spacings and voltage requirements
- Compatible with 2IO series mounting boards

ENGINEERING DATA (all I/O modules)

Duty: Continuous
Isolation: 4,000V rms, 60 Hz (Pins 1 & 2 shorted; pins 3, 4 and 5 shorted).
Transient Noise Immunity: > 3,000V $_{p-p}$ (NEMA ICS2-230).
Insulation Resistance: 10^{11} ohms @ 500V DC, minimum.
Moisture Resistance: 10^{11} ohms @ 500V DC, minimum.
Capacitance: 10 pF maximum (input to output).
Operating Temperature: –30°C to +80°C.
Storage Temperature: –40°C to +85°C.
Case Material: Self extinguishing, 94VO.
Solderability: 260°C for 10 seconds, maximum.
Approximate Weight: 1.48 oz (42 grams).

I/O MODULE ORDERING INFORMATION

Typical Part Number ► **OAC** | **–5** | **H**

1. BASIC SERIES:
IAC = Single AC input module — yellow case
IDC = Single DC input module — white case
OAC = Single AC output module — black case
ODC = Single DC output module — red case

2. INPUT OR LOGIC VOLTAGE:
-5 = 5 VDC (3-6 VDC)
-15 = 15 VDC (9-18 VDC)
-24 = 24 VDC (18-28 VDC)

3. OPTIONS:

Blank =	IAC Type	—120 VAC/VDC input (90-140 VAC/VDC) * *
	IDC Type	— 10-36 VDC input * *
	OAC Type	— 3A, 12-250 VAC, zero voltage turn-on output
	ODC Type	— 3A, 5-60 VDC output
A =	IAC Type	— 240 VAC/VDC input (180-280 VAC/VDC) * *
	OAC Type	— 3A, 12-280 VAC, zero voltage turn-on output
	ODC Type	— 1A, 10-200 VDC output
	IDC Type	— 18-60 VDC input
D =	IDC Type	— 3-32 VDC input * * *
E =	IAC Type	— 10-36 VAC/VDC input
F =	IDC Type	— 4-16 VDC input & fast turn-on & turn-off timer * *
H =	OAC Type	— 5A, 12-280 VAC, zero voltage turn-on output
	ODC Type	— 5A, 5-60 VDC output
J =	OAC Type	— 6A, 20-280 VAC, zero voltage turn-on output
NC =	OAC Type	— 3A, 12-280 VAC, normally closed output * * * *
R =	OAC Type	— 5A, 12-280 VAC, random voltage turn-on output
RJ =	OAC Type	— 6A, 12-280 VAC, random voltage turn-on output

* * Is not polarity sensitive
* * * Is input polarity sensitive (+ voltage must connected to terminal #1 and – voltage to terminal #2)
* * * * Only available with 5VDC input (OAC-5NC)

STOCK ITEMS – The following items are normally maintained in stock for immediate delivery.

IAC-5	IAC-24	IDC-5F	IDC-24A	OAC-5J	OAC-15H	OAC-24H	ODC-5H	ODC-24H
IAC-5A	IAC-24A	IDC-15	IDC-24D	OAC-5NC	OAC-15J	OAC-24J	ODC-15	
IAC-5E	IAC-24E	IDC-15A	IDC-24F	OAC-5R	OAC-15R	OAC-24R	ODC-15A	
IAC-15	IDC-5	IDC-15D	OAC-5	OAC-5RJ	OAC-15RJ	OAC-24RJ	ODC-15H	
IAC-15A	IDC-5A	IDC-15F	OAC-5A	OAC-15	OAC-24	ODC-5	ODC-24	
IAC-15E	IDC-5D	IDC-24	OAC-5H	OAC-15A	OAC-24A	ODC-5A	ODC-24A	

IAC
AC Input Modules

T-52-13-35

INPUT SPECIFICATIONS

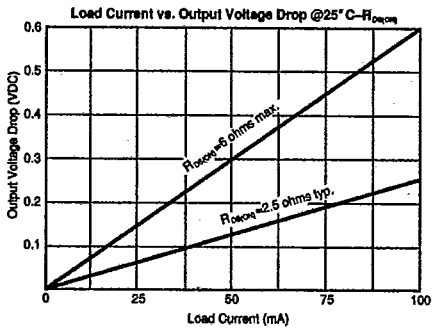
Parameter	Conditions	Units	IAC-5 IAC-15 IAC-24			IAC-5A IAC-15A IAC-24A			IAC-5E IAC-15E IAC-24E		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Control Voltage Range V_{IN}		VAC/VDC	90	120	140	180	240	280	10	24	36
Operate Voltage $V_{IN\ (OP)}$		VAC/VDC			90			180			10
Release Voltage $V_{IN\ (REL)}$		VAC/VDC	20			20			3		
Operate Current	@V_{IN} =$V_{IN\ (OP)}$	mA		5	7		5	7		3	5
Release Current	@V_{IN} =$V_{IN\ (REL)}$	mA	.5	.6		.5	.6		.5	.6	
Input Current	@V_{IN} =Typ.	mA		7	9		7	9		8	11
	@V_{IN} =Max.	mA		8	10		8	10		13	16
Input Resistance R_{IN}		Ohms		18K			36K			2.7K	

OUTPUT SPECIFICATIONS (@ +25°C unless otherwise specified)

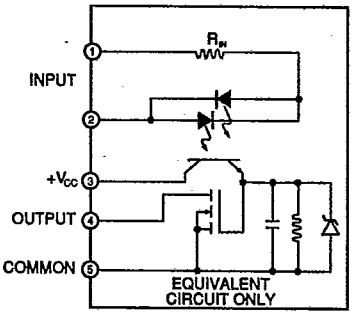
Parameter	Conditions	Units	IAC-5 IAC-15 IAC-24			IAC-5A IAC-15A IAC-24A			IAC-5E IAC-15E IAC-24E		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Output Voltage $V_{DS(OFF)}$		V DC			30			30			30
Output Current I_{SINK}*		mA DC			100			100			100
Output Leakage Current	V_{DS} =Max.	µA DC			100			100			100
Output Voltage Drop $V_{DS(ON)}$	V_{CC}=Min. I_{SINK} =50mA	V DC			.4			.4			.4
	V_{CC}=Min. I_{SINK}=100mA	V DC			.6			.6			.6
Output On Resistance $R_{DS(ON)}$		Ohms		2.5	6		2.5	6		2.5	6
Logic Supply Voltage V_{CC}		V DC	3	5	6	9	15	18	18	24	28
Logic Supply Current	V_{CC} =Typ.	mA DC		16			16			16	
Turn-On Time	V_{CC} =Min.	ms			20			20			20
Turn-Off Time	V_{CC} =Min.	ms			20			20			20
Output Type			Normally Open (SINKING)			Normally Open (SINKING)			Normally Open (SINKING)		
Package Type				1			1			1	

*Inductive loads should be diode suppressed.

ELECTRICAL CHARACTERISTICS



OPERATING DIAGRAM



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OAC
AC Output Modules

INPUT SPECIFICATIONS

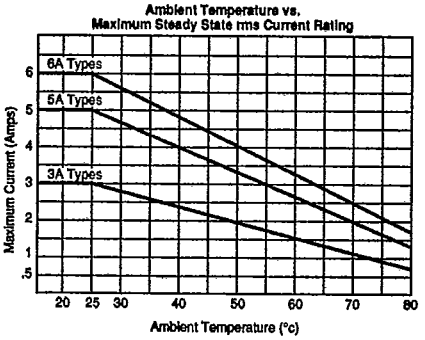
Parameter	Conditions	Units	OAC-5 OAC-5A OAC-5H OAC-5J			OAC-5R OAC-5RJ OAC-5NC			OAC-15 OAC-15A OAC-15H OAC-15J			OAC-15R OAC-15RJ			OAC-24 OAC-24A OAC-24H OAC-24J			OAC-24R OAC-24RJ		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Control Voltage Range V_{IN}		V DC	3	5	6	9	15	18	18	24	28									
Operate Voltage $V_{IN\ (OP)}$		V DC			3			9			18									
Release Voltage $V_{IN\ (REL)}$		V DC	1			1			1											
Operate Current	@V_{IN} =$V_{IN\ (OP)}$	mA DC		9	11		11.5	13.5		11	13									
Release Current	@V_{IN} =$V_{IN\ (REL)}$	mA DC	.1			.1			.1											
Input Current	@V_{IN} =Typ.	mA DC		19	22		20	24		15	18									
	@V_{IN} =Max.	mA DC		24	28		25	29		18	21									
Reverse Voltage Protection		V DC			6			18			28									
Input Resistance R_{IN}		Ohms		200			680			1500										

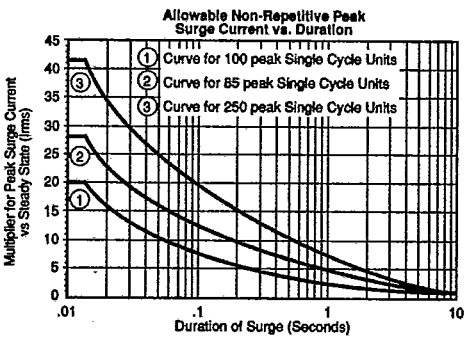
OUTPUT SPECIFICATIONS (25 to 70 Hz @ +25°C unless otherwise specified)

Parameter	Conditions	Units	OAC-5 OAC-15 OAC-24 OAC-5A OAC-15A OAC-24A			OAC-5H OAC-15H OAC-24H			OAC-5J OAC-15J OAC-24J			OAC-5R OAC-15R OAC-24R			OAC-5RJ OAC-15RJ OAC-24RJ			OAC-5NC		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Load Voltage V_L		V rms	12	120/240	280	12	120/240	280	20	120/240	280	12	120/240	280	20	120/240	280	12	120/240	280
Repetitive Blocking Voltage		V peak		±600			±600			±600			±600			±600			±600	
Load Current I_L* (See Derating Curve)		A rms	.02		3	.02		5	.05		6	.02		5	.05		6	.02		3
Single Cycle Surge Current		A peak			85			100			250			100			250			85
Leakage Current (Off-State) @ 60 Hz.	V_L= 120V AC	mA rms		.5	.75		.5	.75		.5	.75		.5	.75		.5	.75		.5	.75
	V_L= 240V AC	mA rms		1	1.5		1	1.5		1	1.5		1	1.5		1	1.5		1	1.5
On-State Voltage Drop	I_L = Max.	V peak			1.6			1.6			1.6			1.6			1.6			1.6
Zero Voltage Turn-On Voltage		V peak		20			20			20			--			--			--	
Repetitive Turn-On Voltage		V peak		15			15			15			15			15			15	
Static dv/dt (Off-State)		V/µs	200	400		200	400		200	400		200	400		200	400		200	400	
Commutating dv/dt * (On State)		V/µs	25			25			25			25			25			25		
Turn-On Time	@f=60Hz	ms			8.3			8.3			8.3			.1			.1			.1
Turn-Off Time		Cycle			1/2			1/2			1/2			1/2			1/2			1/2
I^2t Rating	t=8.3ms				30			41			259			41			259			30
Output Type (Form)			Normally Open (1A)			Normally Open (1A)			Normally Open (1A)			Normally Open (1A)			Normally Open (1A)			Normally Closed (1B)		
Package Type			1			1			1			1			1			2		

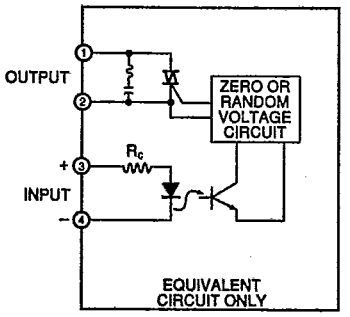
* Inductive Load Switching For Loads With 0.4 To 1.0 Power Factor

ELECTRICAL CHARACTERISTICS





OPERATING DIAGRAM



T-52-13-35

IDC
DC Input Modules

INPUT SPECIFICATIONS

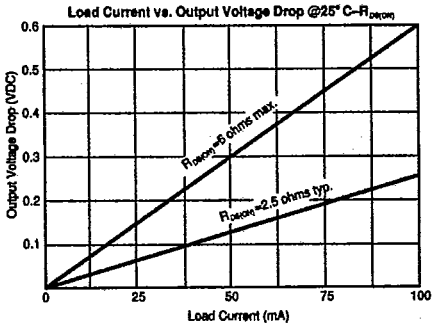
Parameter	Conditions	Units	IDC-5 IDC-15 IDC-24			IDC-5A IDC-15A IDC-24A			IDC-5D IDC-15D IDC-24D			IDC-5F IDC-15F IDC-24F		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Control Voltage Range V_{IN}		V DC	±10	±24	±36	±18		±60	3		32	±4		±16
Operate Voltage $V_{IN(OP)}$		V DC			±10			±18			3			±4
Release Voltage $V_{IN(REL)}$		V DC	±3			±6			1			±1		
Operate Current	@V_{IN} =$V_{IN(OP)}$	mA		3.5	4		4	5		9	10		4	5
Release Current	@V_{IN} =$V_{IN(REL)}$	mA	.8	1		.8	1		.005	.01		.8	1	
Input Current	@V_{IN} =Typ.	mA		8	10									
	@V_{IN} =Max.	mA		13	15		14	16		13	15		20	23
Input Resistance R_{IN}		Ohms		2.7K			4.3K			--			750	

OUTPUT SPECIFICATIONS (@ ±25°C unless otherwise specified)

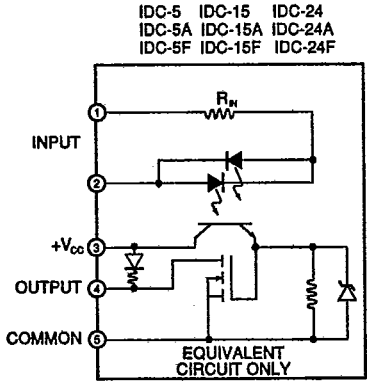
Parameter	Conditions	Units	IDC-5 IDC-5A IDC-5D			IDC-15 IDC-15A IDC-24D			IDC-24 IDC-24A IDC-24D			IDC-5F			IDC-15F			IDC-24F		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Output Voltage $V_{DS(OFF)}$		V DC			30			30			30			30			30			30
Output Current I_{SINK}*		mA DC			100			100			100			100			100			100
Output Leakage Current	V_{DS} =Max.	µA DC			100			100			100			100			100			100
Output Voltage Drop $V_{DS(ON)}$	V_{CC}=Min. I_{SINK}=50mA	V DC			.4			.4			.4			.4			.4			.4
	V_{CC}=Min. I_{SINK}=100mA	V DC			.6			.6			.6			.6			.6			.6
Output On Resistance $R_{DS(ON)}$		Ohms		2.5	6		2.5	6		2.5	6		2.5	6		2.5	6		2.5	6
Logic Supply Voltage V_{CC}		V DC	3	5	6	9	15	18	18	24	28	3	5	6	9	15	18	18	24	28
Logic Supply Current	V_{CC} =Typ.	mA DC		16			16			16			16			16			16	
Turn-On Time	V_{CC} =Min.	ms		.1	5		.1	5		.1	5		.1	.2		.1	.2		.1	.2
Turn-Off Time	V_{CC} =Min.	ms		.5	5		.5	5		.5	5		.5	1		.5	1		.5	1
Output Type			Normally Open (sinking)			Normally Open (sinking)			Normally Open (sinking)			Normally Open (sinking)			Normally Open (sinking)			Normally Open (sinking)		
Package Type			1; (IDC-5 & IDC-5A) 2; (IDC-5D)			1; (IDC-15 & IDC-15A) 2; (IDC-15D)			1; (IDC-24 & IDC-24A) 2; (IDC-24D)			1			1			1		

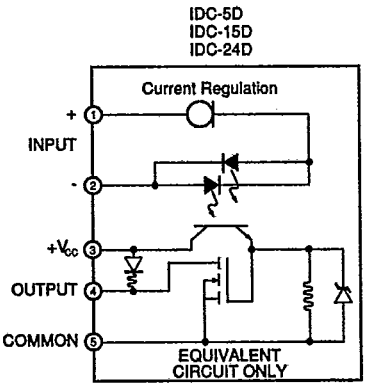
*Inductive Loads Should Be Diode Suppressed.

ELECTRICAL CHARACTERISTICS



OPERATING DIAGRAM





ODC
DC Output Modules

T-52-13-35

INPUT SPECIFICATIONS

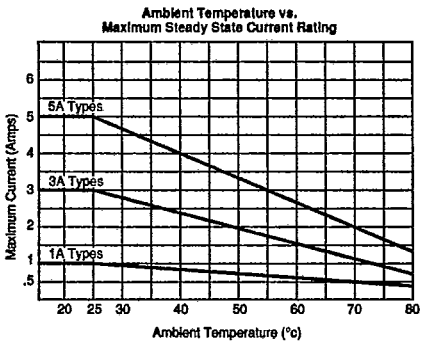
Parameter	Conditions	Units	ODC-5 ODC-5A ODC-5H			ODC-15 ODC-15A ODC-15H			ODC-24 ODC-24A ODC-24H		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Control Voltage Range V_{IN}		V DC	3	5	6	9	15	18	18	24	28
Operate Voltage $V_{IN(OP)}$		V DC			3			9			18
Release Voltage $V_{IN(REL)}$		V DC	1			1			1		
Operate Current	@V_{IN} =$V_{IN(OP)}$	mA DC		7	8		8	9		8	9
Release Current	@V_{IN} =$V_{IN(REL)}$	mA DC	.7			.7			.7		
Input Current	@V_{IN} =Typ.	mA DC		14	17		14	16		10	12
	@V_{IN} =Max.	mA DC		18	21		17	20		12	14
Reverse Voltage Protection		V DC			6			18			28
Input Resistance R_{IN}		Ohms		270			1000			2200	

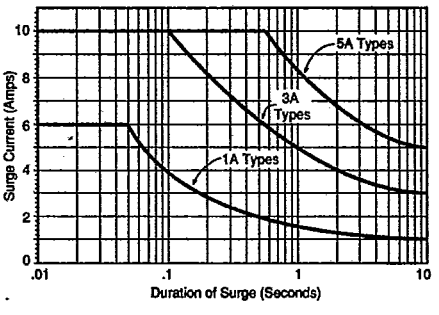
OUTPUT SPECIFICATIONS (@+25°C unless otherwise specified)

Parameter	Conditions	Units	ODC-5 ODC-15 ODC-24			ODC-5A ODC-15A ODC-24A			ODC-5H ODC-15H ODC-24H		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Load Voltage V_L		V DC	5		60	10		200	5		60
Load Current I_L * (See Derating Curve)		A DC	.02		3	.02		1	.02		5
Surge Current For 1 Second		A DC			5			1.5			8.5
Leakage Current (Off-State)	V_L=Max.	µA DC		.1	1		1	10		.1	1
On-State Voltage Drop	I_L=Max.	V DC		1.2	1.6		1.5	3.0		1.2	1.6
Turn-On Time		ms		.02	.2		.5	2		.02	.2
Turn-Off Time		ms		.4	1		1.5	3		.4	1
Output Type (Form)			Normally Open (1A)			Normally Open (1A)			Normally Open (1A)		
Package Type				1			1			1	

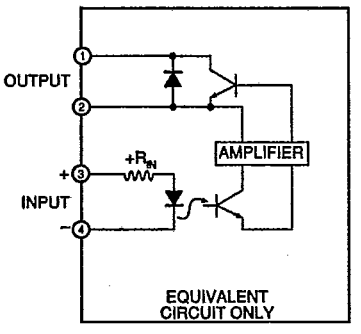
*Inductive Loads Should Be Diode Suppressed.

ELECTRICAL CHARACTERISTICS





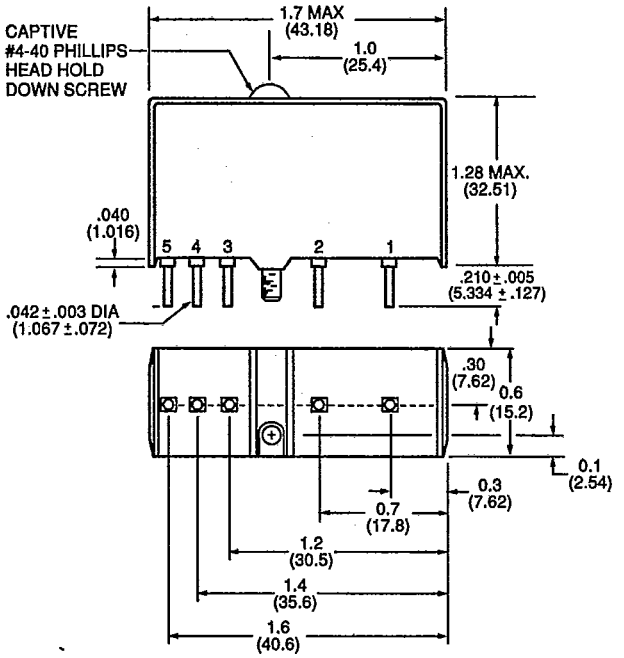
OPERATING DIAGRAM



OUTLINE DIMENSIONS

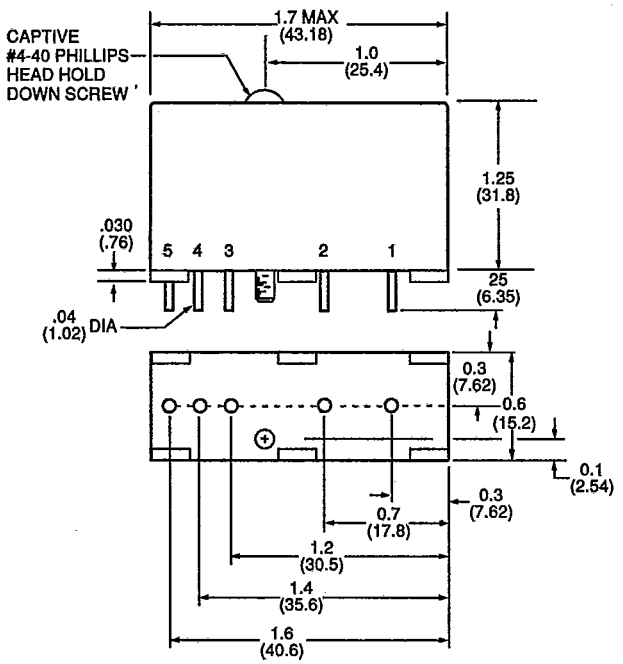
T-52-13-35

Package Type 1–Molded



Note: Pin 5 is not present on Output Modules.

Package Type 2–Potted



Note: Pin 5 is not present on Output Modules.

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