GAFFER & ELECTRIC POWER DISTRO & DMX CARD

Norms Studio Equipment
Hollywood, California, USA · Est. 1962
Amperage & Drop Calc: /rigging-calculators

1. SERIES 16 CAM-LOK MAKE / BREAK ORDER (120/208V 3-PHASE WYE)

CONNECT STEP	CONDUCTOR	COLOR	VOLTAGE	4/0 AMPACITY	BREAK ORDER
1st Made	Equipment Ground	**Green**	0 V Earth Ref	400 A Continuous	5th (Last Off)
2nd Made	Neutral (Double)	**White (×2)**	0 V Star Point	400 A / 800 A (2×4/0)	4th Off
3rd Made	Phase A (L1)	**Black**	120 V L-N / 208 V L-L	400 A Continuous	1st–3rd Off
4th Made	Phase B (L2)	**Red**	120 V L-N / 208 V L-L	400 A Continuous	1st–3rd Off
5th Made	Phase C (L3)	**Blue**	120 V L-N / 208 V L-L	400 A Continuous	1st–3rd Off

2. NEC 3% VOLTAGE DROP & STINGER WIRE GAUGE LIMITS (120V AC · ΔV = 2·K·I·L / CM)

CONDUCTOR GAUGE	CIRCULAR MILS	RESISTANCE	MAX 3% @ 16A	MAX 3% @ 20A	FIELD ROLE
14 AWG	4,110 cmil	3.07 Ω/kft	**35.8 ft**	28.6 ft	Practicals / low-wattage only
12 AWG (Std Stinger)	6,530 cmil	1.93 Ω/kft	**56.9 ft**	45.5 ft	Everyday stage stingers (≤ 50 ft)
10 AWG (Heavy Stinger)	10,380 cmil	1.21 Ω/kft	**90.4 ft**	72.3 ft	Long 1800W–2K head runs
6 AWG (60A Bates)	26,240 cmil	0.491 Ω/kft	**228.7 ft**	183.0 ft	Stage Bates sub-distribution
4/0 AWG (400A Feeder)	211,600 cmil	0.0608 Ω/kft	**1,844 ft**	1,475 ft	Tow-plant main feeder lines

3. GENERATOR & PHASE RULES

- **80% Continuous Duty:** Cap 20A breakers at **16 A (1,920 W @ 120V)**.
- **3-Phase Line Current:** I = P / (√3 × 208V × PF). A 100kW genny yields ~**292 A/leg** @ 0.95 PF.
- **Phase Balance & Neutral:** Keep A/B/C legs within **10%**; run **Double-Neutral (2× 4/0 White)** for 180Hz LED/HMI triplen harmonics.
- **Grounding & Sync:** Single N-G bond at source to **8-ft copper rod (≤ 25Ω)**; Crystal Sync **60.00 Hz ±0.05%**; Class A **4–6 mA GFCI** near water.

4. ANSI E1.11 DMX512-A (5-PIN XLR) & CRMX

PIN	SIGNAL	FUNCTION
Pin 1	Shield / Common	Chassis & signal ground reference
Pin 2	Data 1−	Inverted differential RS-485 (−)
Pin 3	Data 1+	Non-inverted differential RS-485 (+)
Pin 4	Data 2− (Opt.)	Auxiliary / RDM talkback (−)
Pin 5	Data 2+ (Opt.)	Auxiliary / RDM talkback (+)

Rules: Use 120Ω twisted DMX cable (never 3-pin mic cord) · Cap final fixture with **120Ω terminator** across Pins 2 & 3 · Max ~32 fixtures/opto port · Turn off RDM polling during sound takes.